‘Overlapping Spheres’:

Factors Related to Children’s Home Learning and School Experience

Georgia C. Leith

Thesis submitted for the degree for Doctor of Philosophy

University of Sussex

May 2016

Statement

I hereby declare that this thesis has not been, and will not be, submitted in whole or in part to another university for the award of any other degree.

Georgia Leith

1st May 2016

Acknowledgements

First and foremost, I would like to express my gratitude to my supervisors, Alison Pike and Nicola Yuill. In retrospect I see that they were applying all the scaffolding techniques on me throughout the PhD process. They helped me manage my own expectations and challenge my low confidence, and through them, I came to realise I had underestimated my own ZPD; turns out perhaps I am PhD student material. For their feedback, their ideas and insights, and their gentle steering when I floundered, I am forever grateful. Ali's work mantras will follow me through life! I also want to thank my two lab groups, the ChatLab and the NurtureLab, for the regular dose of feedback, discussion, moral support and cake.

A busy office is distracting but sociable; an empty office is quiet but lonely. I have been exceptionally lucky with having the best of both worlds. My wonderful officemates over the years, Fidelma Hanrahan, Kerry Fox, Berna Aytac, Laura Pearce, Lucy Morgan and Clio Berry, created a respectful and supportive environment. And the help from Pennie Ingram, Dan Hyndman and Martha Casey was invaluable.

I never would have thought that going into a different stranger's home each day would be the best thing about the whole three years. I am very grateful to the families who took part in my research, for being so generous with their time and so trusting of me – what a fabulous bunch of children I met! I wish all eighty-five of them the best in life. I'd also like to give a shout-out to the teachers who took part too, and completed questionnaires that never even made it into the thesis. I hope one day I can use the data.

My double-coders through the years (Bethany, Alex, Amy and Martin) were all stars to help me with my convoluted coding schemes.

I am indebted to other faculty members for conceptual and practical help. Among them are Bonny Oliver, Robin Banerjee and Jessica Horst. My one-to-one conversations with academics along the way (like David Whitebread, Amanda Carr and Stuart Hammond) also provided fresh perspectives that were so helpful.

I'd like to acknowledge the amazing friends I have in the university, and outside in the *real* world, for their patience when socialising was low on my to-do list, and their availability when I needed a refuel or some escapism. And Daryl certainly deserves acknowledgement for the unique role he's played in my life for the last four years.

Of course, my wonderful family are owed enormous gratitude. My glorious Mammy-boss – proof-reader extraordinaire – was hands-off when I needed it, and leapt in as soon as I showed a glimmer of frustration, anguish or disillusionment. Ella, my sister, was the only other active member of the Anti-PhD club, whose frequent phone calls to bemoan the doctoral world turned out to be a lifeline. We've made it! And my dad, of course – who was so excited to know I was embarking on this studentship, and he never got to see me start my PhD, the photograph of him above my desk has seen me the whole way through, from the day I arrived into my office until the day I clear my desk out.

And finally, I would like to thank my husband-to-be, Edward. For the loan of the car to do home visits; for the inspired use of images of micro-donkeys to soothe me in the darkest points of statistics woe; for the country walks and the refilled wine-glasses; for perfecting feigned interest in riveting descriptions of bootstrapped confidence intervals and factorial analysis. Every PhD student needs an Ed. Luckily for me, I've got this 'un for life as well.

This report was funded by a grant from the ESRC (ES/J500173/1).

UNIVERSITY OF SUSSEX

Georgia Leith

Thesis submitted for the degree of Doctor of Philosophy

‘Overlapping Spheres’:

Factors Related to Children’s Home Learning and School Experience

Summary

A child’s early academic learning experiences take place at home as well as at school. These two ‘overlapping spheres’ have unique roles to play for the child, and affect them in different ways. In this thesis, I focus on the child’s home life, and mother-child interactions nested within the home, and investigate how individual and dyadic characteristics of child and of mother may have a bearing on the quality of children’s academic and non-academic learning experiences at home, and on their experience of school.

The first three papers used data from eighty-five families of Year 1 children in South-East England. This data was collected using questionnaire and interview measures and videotaped observations of mother-child interactions during home visits.

Paper 1 explores personal and social factors in Year 1 children relating to their self-reported school adjustment. Results from interviews showed that family and home life were important for academic self-concept, but not for school engagement, further reinforcing existing research showing that each distinct environment within the child’s microsystem affects their experience of the other.

Paper 2 focused on homework: an area of children's formal education outside school. Most homework interaction research uses researcher-set activities; my study tested the validity of this by comparing genuine homework and a researcher-set task. In observations of 85 families of year 1 children, mother's and child's affect during genuine homework did not correlate with their affect during the non-homework tutored task, and were related to different personal and social factors.

Taking this further, Paper 3 investigated whether maternal beliefs about education predicted how she scaffolded her child during Year 2 homework. This paper used data from eighty of the families, visited a year after the original visit. Results showed that instruction quality during homework was predicted by mothers' earlier learning attribution beliefs, but not by their attitudes or expectations.

Homework is believed to help children refine their self-regulation skills. Paper 4 examined maternal scaffolding interactions through the conceptual lens of 'transfer of regulation'. Using a different dataset of home visits with seventy-eight families of children aged 8-11, the fine-grained coding method sheds light on aspects of tutored interactions typically missed by traditional scaffolding coding schemes, identifying various aspects of self-regulation and other-regulation, and mapping increases and decreases over the course of the task, thus providing rich information about the interaction quality within each mother-child dyad.

In conclusion, both social (transfer of regulation: Paper 4; parenting styles, mother-child relationship: Paper 1) and individual (maternal beliefs and personality: Papers 2 and 3) factors within the home context play a role in the child's learning and school experience – as assessed by academic self-concept, self-regulation, and the positivity and cognitive support received during homework. This thesis further reveals

the interlaced nature of home and school, highlighting the value of unpacking the role of the home environment on children's education.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

BPI	Berkeley Puppet Interview
BPVS	British Picture Vocabulary Scale
CHAOS	Chaos, Hubbub and Order Scale
CSR	Child self-regulation
EASI	Emotionality, Activity, Sociability and Impulsivity Scale
ICC	Intra-class correlation coefficient
MOR	Maternal other-regulation
PAFAS	Parent and Family Adjustment Scale
PARCHISY	Parent Child Interaction System
SES	Socio-Economic Status
ZPD	Zone of Proximal Development

List of Appendices

Chapter 1:

General Introduction

Introduction

Children do not develop in a vacuum; throughout the course of their development they are in constant interaction with their immediate environment. Decades of child development research have confirmed that this interaction has a powerful bearing on children's developmental trajectories from infancy and through to adulthood.

Young children spend most of their lives at home and in school; fittingly, empirical evidence has confirmed that features of these two environments impact on aspects of children's social, emotional and cognitive development. However, less is known about how the interplay *between* these two separate environments may have its own unique role in children's development. Specifically, questions remain regarding how factors about home and family life affect the way children feel towards school, and how schoolwork and structured learning plays out at home.

Maternal, child and dyad factors relate to the interaction style between mother and child, and the quality of the tutoring during learning interactions, which are critical to a child's cognitive development. Less understood is whether this extends to school-related work (homework). In parallel, while aspects of the home climate have been associated with children's social and emotional development, it is unclear how life at home may relate to children's development of self in the school context. This thesis addresses these gaps in the knowledge with a series of empirical studies.

The purpose of this introductory chapter is to provide an overview of theoretical perspectives and empirical evidence on contextual and socio-cognitive development that this thesis builds on, and link this to the empirical research detailed in the following chapters.

The goals of this chapter are:

- To outline and evaluate existing theories on child development in a social context and on dyadic socio-cognitive learning;
- To provide a background of the existing empirical work building on these theories, which associate maternal, child and context factors with children's cognitive and emotional development;
- To outline and critique the methodologies used to operationalise these theories;
- To detail the existing evidence surrounding homework – an area where home and school meet, and which is a central focus for this thesis;
- To outline the research questions and aims of this programme of research;
- And to give an overview of the hypotheses and methods for each empirical study featured in the rest of the thesis.

The Role of Multiple Contexts on Children's Development

As well as the behaviour and personality that children inherit from their parents genetically, child's development is sculpted by external factors within their lifetime. Several theorists have attempted to systematise how environmental contexts shape a child's developmental course, which has then gone on to inform scientific enquiry. One early comprehensive account was provided by Urie Bronfenbrenner's bioecological theory of human development. Later influential models included Epstein's 'overlapping spheres of influence'. These two theories I shall detail in turn.

Bronfenbrenner's Bioecological Model

In the late 1970s, Bronfenbrenner argued for a departure from the tendency for developmental psychology research to examine development outside the social contexts in which a child is directly embedded (Bronfenbrenner, 1977). He proposed that an ecology stance, borrowed from biological analyses, should be incorporated into

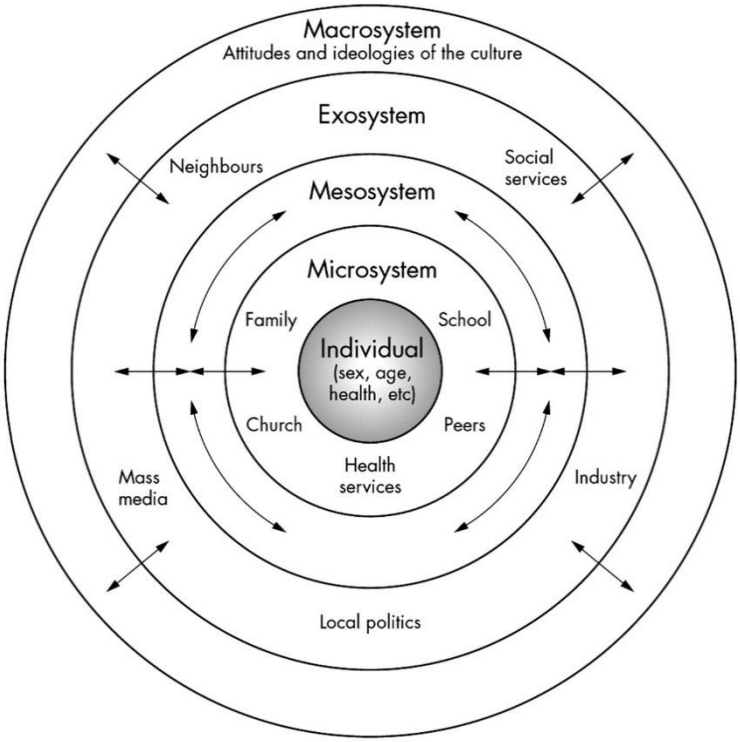
psychology research, to acknowledge the role of the environment on the development of the organism.

Bronfenbrenner's model aimed to draw together all the proximal and distal environmental forces impacting on a child's developmental course, placing them in nested systems (see Fig. 1.1). The *microsystem* included the child's immediate settings, for example the family home, school, and peer group. The *exosystem*, the surrounding contexts such as the neighbourhood, religious congregation, and mass media, encircles this microsystem. The distal *macrosystem* contains cultural attitudes and ideologies which influence the child's exosystem. The contexts within the microsystem also interact within themselves; these interactions within this *mesosystem* have an additional effect on the individual. Most important to this thesis is the role of the interaction between home and school on children's development in school and learning related development.

In Bronfenbrenner's own later reflections of his model, he recognised that the specific role the child plays in their own development had not been emphasised enough (Bronfenbrenner, 1989; see Tudge, Mokrova, Hatfield, & Karnik, 2009). In modifications of his model, he incorporated genetic and biological aspects of the person (Bronfenbrenner & Morris, 2006). However, it has been noted that the model does little to inform whether individual differences within the child's microsystem, such as parent personality, shapes his or her outcomes (Belsky & Barends, 2002).

Figure 1.1

Bronfenbrenner's bioecological model of human development (source: Dunn, Masyn, Yudron, Jones, & Subramanian, 2014)



While the ecological theory Bronfenbrenner posited has changed over the years (Tudge et al., 2009), the model of the self embedded within other systems, in its early forms and its modified versions, has provided a useful framework for developmental psychology studies to explore the role of the school in children's development (not only academic and cognitive development, but also emotional and social development). It has also been a springboard for understanding the role of the family, in all its complexity. Additionally, the concept of the *mesosystem* has allowed for the abundance

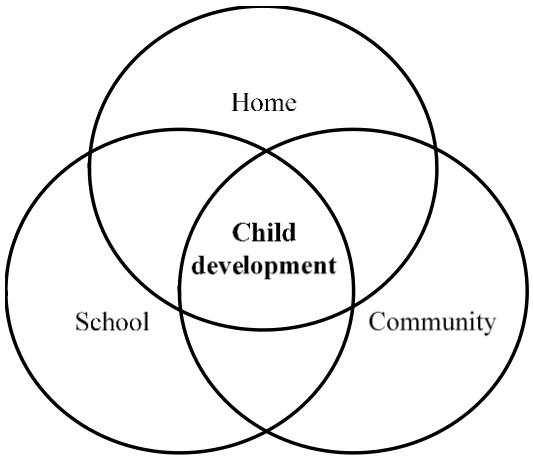
of research into the ways in which the child's home life and school life might interact with each other, and the effect this interaction has on the child.

Epstein's 'Overlapping Spheres of Influence'

With her background in sociology, Joyce Epstein came to the role of context in child development from a different starting-point to Bronfenbrenner. Epstein (1992, 2002) proposed that a child has the best chance of flourishing academically if there is a strong partnership between home and school. Echoing Bronfenbrenner's concept of the influence of the *mesosystem* on human development, Epstein described how the most relevant contexts of the child – home, school, and community – overlap with each other, to a greater or lesser extent according to multiple factors (Epstein, 1992; 2002; 2011). Within this Venn diagram of spheres of influence for the child (see Fig. 1.2), Epstein outlined multiple theoretical forces at work, which drive the spheres together or apart. These forces are attributed to the actions (or inaction) of the participants in the child's development: the teachers (or institution), the parents, and the child (Epstein, 2002). For example, when parents and teachers come together (e.g., parents' evenings), this strengthens the partnership between home and school. Similarly, if children do not communicate to their parents about what has been happening at school (e.g., feedback given by the teacher in class), the school and home spheres become less overlapped and more distant. Epstein proposed that the most nurturing environment for a child during development (in terms of their academic outcomes as well as other developmental outcomes) is one with high overlaps between the spheres, and that this is something that parents and teachers should strive for.

Figure 1.2

Visualisation of Epstein's 'overlapping spheres of influence'



This conceptual model has provided an additional framework for understanding whether, and how, parents are involved in their child's formal education experience, what affects involvement, and the benefits and disadvantages of parental involvement in school (see Fig. 1.3 for condensed overview), as well as for examining how these 'forces' work, and whether it is possible to predict mechanisms of creating more or less overlap. Overall, this model emphasises the importance not just of how the different contexts in which the child is embedded interact, but also the influences on and consequences of the interactions. This model provides a theoretical structure upon which this thesis hangs its research enquiries.

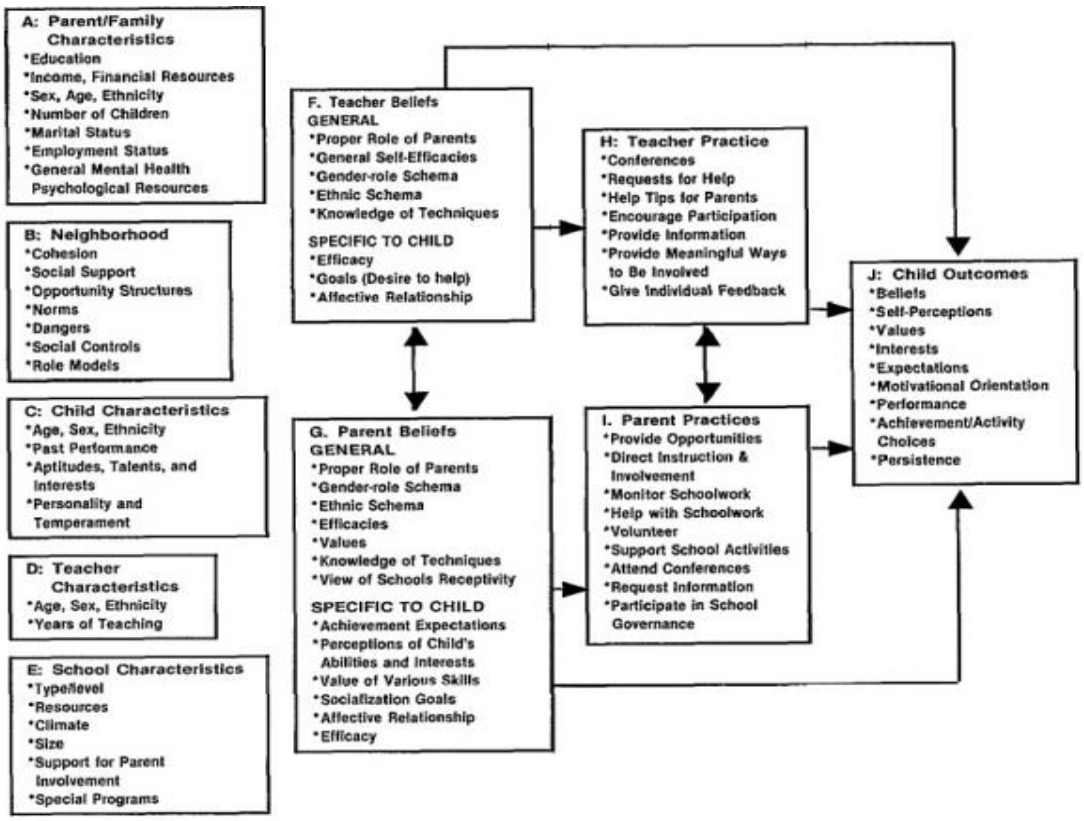
Dyadic Influences on Child Development

A child's development is also related to dyadic qualities of the mother and child together. As primary caregiver, the mother is a core aspect of a child's development; thus, the role of the mother, and of the mother-child relationship, is an especially salient

factor in their interaction style. Two key theories, Belsky's family process model and Sameroff's transactional model, are useful foundations from which we can understand the role of the mother, the child and their relationship in how they interact together in both academic and non-academic joint tasks.

Figure 1.3

Multiple child, teacher and parent factors influencing parent involvement in school and the implications of involvement (source: Eccles & Harold, 1996)



Belsky's Family Process Model

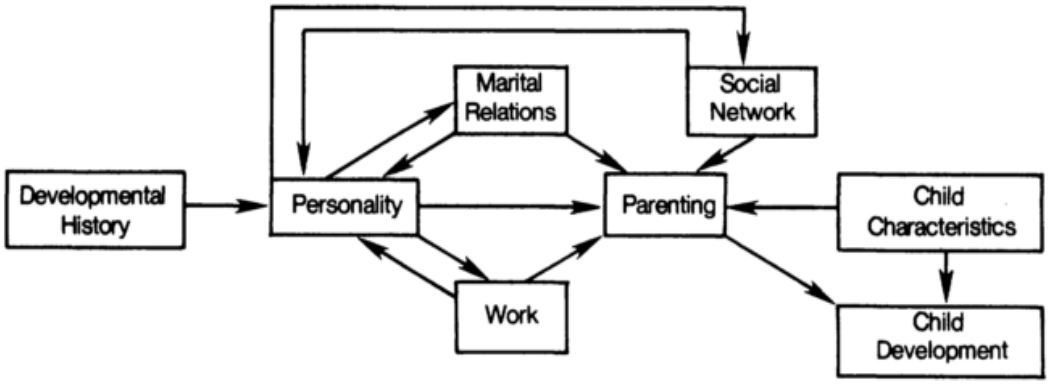
In 1984, Jay Belsky developed an integrated model of the processes existing within and outside the family that may affect parenting and go on to affect child development. He argued that existing research into parenting dysfunctions and child maltreatment could inform us about how parents' behaviour affects children in less extreme cases on the same continuum (Belsky, 1984). Drawing on Bronfenbrenner's ecological framework, and existing findings into relations between parent and child personality, Belsky proposed that parenting and interaction style in the typical population is affected by three categories of influence: the parent's developmental history and personality; the child's contribution (especially temperament); and the larger social context the dyad is nested in (including marital quality, work, social support) (see Fig. 1.4). Much like Bronfenbrenner and Epstein, Belsky recognised the importance of the child's environment for development. However, Belsky added to these by concentrating on a highly relevant aspect of the child's environment: namely the mother-child dyad.

Belsky's family process model incorporated the parent's personality into the child's developmental environment, observing that a 'healthy personality' gives rise to more sensitive parenting (Belsky, 1984, p. 86). Personality was seen to have a substantial bearing on parenting (Belsky & Barends, 2002). Adding to the complexity was the interaction between parent personality and child temperament; Belsky suggested that a parent's parenting style may be due to the 'fit' of his or her character to the child's. While most of the empirical evidence informing this claim involved data from infant parenting, it is reasonable to assume that these early interactions go on to influence later dyadic quality, and child development; the history of the quality of early

mother-child interactions may influence current ones, even if circumstances and individual characteristics change.

Figure 1.4

Family Process model of parenting (source: Belsky, 1984)



Belsky's account of the role of the social context focused mainly on marital quality, but also addressed social support. Here, we can draw parallels with Epstein's 'overlapping circles of influence' model. How connected the child's different social environments are has a bearing on the child's developmental outcomes: similarly, the strength and quality of the parent's social world shapes the quality of the parenting the child receives. Additionally, Belsky outlined the way parents set expectations and standards as a benefit of high quality social support for the parent – and shared, consistent educational values were something which Epstein also referred to as a positive outcome for the child if a strong partnership exists between home and school (Epstein, 2002). Both theories emphasise the importance of the area of convergence: either between home and school, or between mother and child. Thus, as well as looking

at mother, child and contextual factors as influences on child development, this thesis also investigates the bidirectional exchange between mothers and children on different tasks and its contribution to the learning (and specifically the homework) experience. The studies outlined in this thesis draw on Belsky's model, by including aspects of the mother, the child and the social context as potential influences or barriers to the child's personal development and to the ways in which the two of them interact. Furthermore, this thesis extends from Belsky's determinants of general parenting, applying the principles to very specific aspects of parenting: fostering the growth of academic self-concept, and delivering high-quality cognitive and emotional support during homework.

Sameroff's Transactional Model

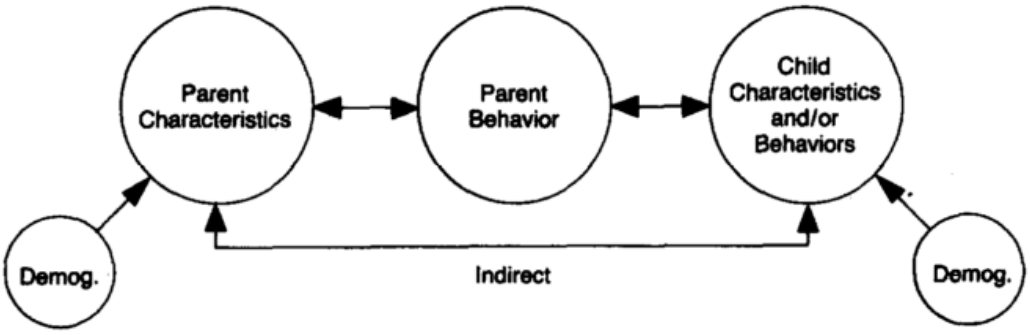
Another conceptual framework of developmental psychology that incorporates the child's immediate context is the transactional model (Sameroff & Chandler, 1975; Sameroff, 2009). While Belsky's family process model developed out of research into parenting dysfunction and child maltreatment, Arnold Sameroff's transactional model emerged from literature into causes of child psychopathology, extending to non-clinical populations and to many areas of child development, including the tutoring-learning experience (Sameroff & Fiese, 2000; Sameroff & Mackenzie, 2003). Sameroff, like Belsky, acknowledged both the child and the environment as important shapers of the developmental course; however, Sameroff placed even greater emphasis on the interplay between individual and context (see Fig. 1.5). He drew attention to the cumulative bidirectional effects of parent and child, describing how the behaviour of one individual is interpreted and internalised by the other, which goes on to affect their responding behaviour and the emotional climate of their interchanges. The reciprocal process whereby mother affects child, who then affects mother, takes place at the micro interaction level incrementally over many years; thus, the child's developmental course

is shaped by the 'complex interplay between dynamic systems' (Sameroff & Mackenzie, 2003, p. 619). Sameroff argued that these dynamics between mother and child are even more influential on development than either individual alone (Sameroff & Chandler, 1975; Sameroff & Mackenzie, 2003; Sameroff, 2009).

This model was unique in its articulation of historical transactions embedded within current ones; the transactional model acknowledges that any given time-point in children's developmental course has been affected by the interplay they had with their environment in historical time-points, and will also go on to influence future time-points. In the case of mother-child dynamics, the early activity of the infant elicits particular responses from the mother, which then affects the child's activity, and this goes on throughout infancy, into childhood and on to adolescence. The cumulative pattern has been identified within interactions, and holds high predictive value across interactions over time, in both infancy research and studies at adolescence (see Sameroff & Mackenzie, 2003).

Figure 1.5

Unidirectional structural model of interactions (source: Sigel & Parke, 1987)



The transactional model of child development has high relevance to children's structured learning experiences in the home. Every interactive experience between mother and child carries with it legacies of recent similar experiences, which themselves were influenced by previous ones. Thus, the learning process for children, especially in social contexts, cannot be accurately observed in isolation; parent personality, child temperament, and their present and historical dynamics are all not only part of the interaction, but are *key* to understanding the nuances of between-family variance.

Homework interactions are a prime example of an interaction between mother and child that was influenced by previous homework interactions. This thesis, therefore, examines the interactional exchange between mother and child as well as individual and context factors, to understand how home and family factors affect school life, homework and learning at home.

Tutor-Learner Interactions: the 'Informal Pedagogy of Everyday Life'

Above, I have outlined the broad theoretical stances towards the effects of social interactions on children's development. Informal teaching is often embedded in these interactions from a very young age. There is an inherently social component of cognitive development (Gauvain, 2005; Rogoff, 1990; Saloman & Perkins, 1998; Vygotsky, 1978; Wood, 1999); and the quality and characteristics of this "informal pedagogy of everyday life" (Tharp & Gallimore, 1998, p. 93) in the early years at home may lay foundations for behaviours in and towards school, and for the child's capacity to learn and to internalise knowledge and skills. Therefore, understanding the tutoring process in mother-child interactions is highly pertinent for investigating child development in the overlapping spheres of home and school.

Vygotsky's Socio-Cognitive Theory

Lev Vygotsky's social constructivist writings, translated into English in 1978, have been highly influential for developmental, cognitive, educational and social psychology, providing a vantage point from which to further explore the *process* of learning in a social context. Vygotsky (1978) described the importance of culture in how children learn and develop. He posited that children develop their knowledge and cognitive capacities through their interactions with their social environment, particularly with a more knowledgeable other. Thus, the child extracts knowledge from the social plane:

> "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, *between* people (*interpsychological*), and then *inside* the child (*intrapsychological*)." (Vygotsky, 1978, p. 57 - his italics).

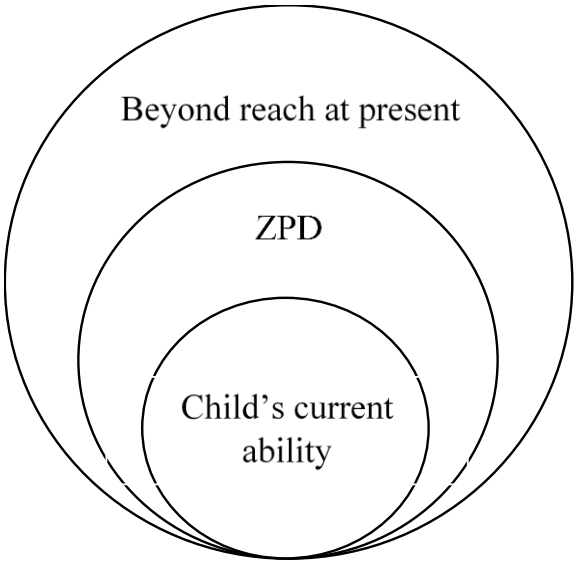
A key notion in Vygotsky's socio-cognitivist work, and a crucial feature for later researchers, was the Zone of Proximal Development (the ZPD), as a way of conceptualising the process of knowledge growth in social interactions. The ZPD is the difference between what a child can achieve alone and what they can achieve with the help and guidance of a knowledgeable other (see Fig. 1.6). Vygotsky considered this hypothetical 'zone' to be so important to understanding how a child grows cognitively that he proposed a child's intelligence should be measured not by what they actually know, but what they are capable of knowing through their social interactions.

The ZPD provided a useful way to understand what the social plane (the tutor) adds to the learning process. Each child has a different ZPD for different tasks, which explains why children learn at different rates; their current knowledge, their capabilities to learn and personal cognitive strengths and weaknesses, and the tutoring

abilities of the knowledgeable other all contribute to the success of the learning interaction. Vygotskian concepts have been used extensively in subsequent research and theory into the learning process. Of particular interest has been *how* the tutor helps the child move through the ZPD to reach their potential; this has been the focus of attention for many theorists since.

Figure 1.6

Visualisation of Vygotsky's Zone of Proximal Development



Though Vygotsky's writings on socio-cognitive development were a catalyst for further exploration and theories into learning on a social plane, it has, however, been critiqued, and attempts made to extend, refine and apply his ideas (Wertsch, 1984). It has been noted that while Vygotsky emphasises the importance of the adult's guidance through a given learning journey, in his essays he never describes what he considered constituted appropriate, or high-quality, guidance, even though we expect the nature of the assistance to be crucial to the effectiveness of the learning (Wertsch, 1984).

Despite this absence of detail about the tutor, Vygotsky's perspective of the social learning experience was markedly adult-centric (Goodnow, 1990; Litowitz, 1993). The lack of attention to the child in the interaction has been problematic, with some researchers emphasising that, for example, '… the child is not merely a passive recipient of adult guidance and assistance.' (Tharp & Gallimore, 1998, p. 95)

A further criticism is highly relevant to subsequent research on tutor-child learning interactions. Litowitz (1993) noted that Vygotsky hardly acknowledges that the social transition of knowledge may not always be an entirely seamless, highly motivated, and pleasant experience. Vygotsky's theories were drawn from his ideal learning process, rather than from real-life interactions. From their detailed observations of parents and children working together in the ZPD, Wood and Wood (1999) note that even the 'best' tutored interactions are not entirely perfect. Furthermore, Vygotsky had little to say about the tutors and learners who are not as highly invested in and valuing of the learning process. As Goodnow points out about Vygotsky's depiction of the transition through the ZPD:

> "Where are the parents who do not see their role as one of imparting information and encouraging understanding? Where are the children who do not wish to

> learn or perform in the first place, or who regard as useless what the teaching adult is presenting?" (Goodnow, 1990, p. 279).

It is from these variations of behaviour, of role construction, of motivation and of attitudes to learning that we can retrieve significant information about *real* learning interactions that do not meet this Vygotskian learning 'ideal'.

Much of the subsequent work on naturally-occurring learning and pedagogy has further developed two important aspects of Vygotsky's socio-cognitive theory: how the transition of knowledge from tutor to learner actually happens, and how the nature of the tutor's assistance aids or thwarts this transition. I shall now outline two highly influential theories which address these: 'scaffolding' and 'transition of regulation'.

Scaffolding

Shortly before Vygotsky's socio-cognitive essays were translated into English, Wood and colleagues were observing how mothers support their children's learning. Their fine-grained descriptions of the actions and interventions of the mother for the child's progress through a tower-building task gave rise to a concept of how the mother provides assistance effectively (Wood, Bruner, & Ross, 1976). They used the metaphor of 'scaffolding' to describe the support the mother provides: when the child's understanding of how to do a task is weak, more 'scaffolding' is built up around the child, and as the child's learning progresses and solidifies, the scaffolding can be slowly dismantled until a robust and permanent knowledge 'structure' remains.

Incorporated in the scaffolding concept are three principles of appropriate adult guidance for progression to mastery. *Contingent shifting* is the sensitive readjustment of the amount of scaffolding support needed at any given time; if the child is showing progress, the tutor provides less cognitive guidance, and then if the child is showing difficulty, the tutor gives more. *Fading* describes the gradual pulling back of the tutor's

involvement over the course of the task, to allow the child to apply their newly-attained knowledge to the challenge and fully master it; thus there is a *transfer of responsibility* from adult to child. According to Wood et al. (1976), following these three principles provides a child with the best assistance to reach their potential.

Soon after, parallels between the scaffolding metaphor and Vygotsky's ZPD were drawn; it appeared that scaffolding was a means of explaining *how* the adult helps the child move through the ZPD, something which Vygotsky had not attempted to explain. Now the two are often described alongside the other (e.g., Granott, 2005; Verenikina, 2003).

Wood, Bruner and Ross' scaffolding concept added to Vygotsky's socio-cognitive theories in two ways. First, it provided a way of understanding the role of the tutor in a social learning context. Second, it acknowledged *optimal* learning experiences; it could accommodate for variations in quality, delivery and progress during the learning process, and thus examine the impact of violations of the principles of contingent shifting and fading.

Difficulties have arisen about the appropriateness of the choice of metaphor. In their evaluation of the concept, Tharp and Gallimore commented that the physicality of the metaphor may limit the possibility of identifying nuances:

> 'Scaffolding suggests that the principal variations in adult actions are matters of quantity – how high the scaffold stands, how many levels it supports, how long it is kept in place. But many of the acts of the adult in assisting the child are qualitatively different from one another.' (Tharp & Gallimore, 1998, p. 99).

Wood conceded that there were flaws in the simplistic nature of the concept, in line with Tharp and Gallimore's observations. He acknowledged that it was not designed to incorporate important dyadic factors such as mother-child relationship

quality (Wood & Wood, 1999), which potentially have an enormous bearing on the delivery, and the receipt, of scaffolded assistance (as evidenced in empirical work). Another limitation Wood highlighted was that the concept focused on a single, isolated task (Wood & Wood, 1999). The nature of the task, the cumulative history of other interactions, and the social context of the task may all give rise to variations between interactions which the scaffolding concept ignored.

As with Vygotsky's essays on the ZPD, the scaffolding metaphor fails to address the contribution the child makes to the learning process. While scaffolding specifically describes the behaviour of the tutor rather than the learner, it attributes success in learning to the tutor's appropriate use of the contingent shifting and fading principles, without acknowledging the child's effort, responsiveness and other relevant aspects of a successful learning experience (D. Wood, personal communication, 15th May 2014). Van Geert and Steenbeek's (2005) description of the tutoring dynamic involved two components: levels of skill of the learner that can change; and mechanisms that make the level change. Wood and colleagues' initial scaffolding concept only covers the latter. Without thoroughly exploring both in a scaffolding interaction, the tutor's effectiveness and appropriateness can only be inferred rather than confirmed.

Transition of Regulation

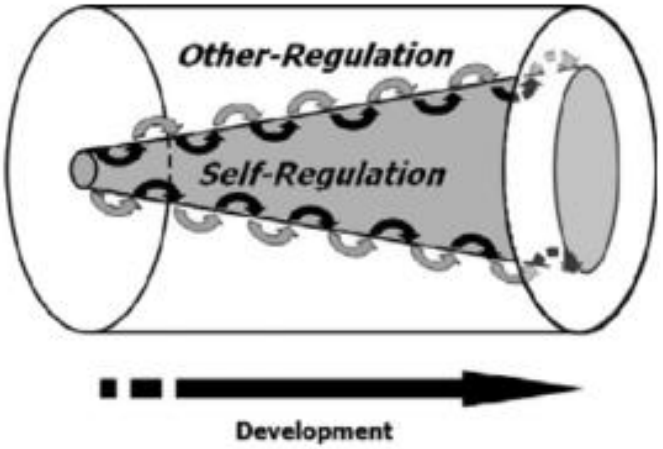
In a direct attempt to shed light on an area neglected by Vygotsky – *how* knowledge gets transferred from adult to child – Wertsch applied Vygotskian theory to his own observations of a tutored exchange. Wertsch (1979) drew on existing ideas and evidence of self-regulation, whereby a child 'learns how to learn' in his or her application of recently acquired skills. Self-regulation encompasses the cognitive skills and capabilities required to manage tasks, such as self-monitoring, self-evaluation, attention and motivation management, and emotion regulation. As children develop

their self-regulation skills through practice, they learn not only how to master the task at hand, but also how to apply the learned strategies so as to master other similar tasks (Tharp & Gallimore, 1998).

As children move from novice to master over the course of a tutored task, their self-regulation skills are improving and being refined to fit the nature of the task. This provides a new insight into the role of the tutor as 'other-regulator'. Wertsch (1979) proposed that during a social interaction within the ZPD, the role of the tutor was to other-regulate the task in ways the child cannot manage, and allows the child to internalise the self-regulatory behaviours required by modelling them. In this way, the regulation required to move through the task is transferred from other-regulation to self-regulation (Fig. 1.7 contains a visualisation of this transition). This account has since been widely used as a sound means to understand *how* a child moves through the ZPD with assistance from an adult.

Figure 1.7

Depiction of the transition of regulation from adult to child (source: Sameroff, 2010)



Self-regulation development is now widely regarded as a product of social input (Schunk & Zimmerman, 1997). The transition of regulation account put forward by Wertsch, whereby a child internalises the other-regulation demonstrated by the adult until full self-regulation is reached, has been incorporated into the study of learning in a social plane. This account adds to scaffolding by identifying the mechanisms that make scaffolded interventions effective. While scaffolding describes what the adult does to guide the child along a learning curve, the regulation theory explains how this works. It also gives credit to the contribution the child makes; Wertsch emphasised that while the tutor is responsible for provision of other-regulation, the internalisation and application of this regulation is down to the child. Granott and colleagues (Granott, Fischer, & Parziale, 2002) used the term 'bridging' to describe the child's self-driven uptake of tutored knowledge. A successful 'transition' is the product of effort from both giver and receiver.

As with Vygotsky, Wertsch failed to provide an account of specific behavioural strategies associated with particular aspects of other-regulation. However, when coupled with scaffolding theory, which is primarily about these strategies and techniques, this can be partially rectified. While the transition of regulation account acknowledges the child's efforts in a way that neither of the other two theories did, in its original form it does not allow for context-specific, task-specific or dyad-specific variations.

Combining these three perspectives of child learning on a social plane, we can examine multiple influencing variables affecting the quality of the other-regulated scaffolding through the ZPD embedded within the multiple contexts theorised by Bronfenbrenner and Epstein. This thesis draws upon all three stances, to examine the socio-cognitive aspect of the homework interaction (and non-homework learning

activities at home), which warranted examination beyond the maternal, child, dyadic, interactional and contextual factors at play during such activities. In order to address the questions in this thesis from a scientific position, I use a range of different research methods to capture these constructs. The research methods are diverse on three levels: measures, methods and models. Scaffolding is measured in three different ways in this thesis, and quality of interaction in terms of cognitive as well as emotional quality. I measure multiple personality factors through self-reports and other-reports, and use both longitudinal cross-sectional models.

From Theory to Method: Operationalising Social Interaction and Tutoring Theories for Empirical Studies

When measuring and quantifying predictors and correlates of child development, there remains a challenge of how to tease apart environmental and genetic contributions. One means of disentangling the two is by using particular methods that complement environmental influences specifically, rather than genetics. As genetics is thought to be more responsible for the development of fixed, stable traits (e.g. Plomin, DeFries, Knopik & Neiderhiser, 2016), measuring within-family changes, rather than between-family differences, can exclude the genetic component to individual development.

Next, I turn to describing and critiquing the ways in which the theories I have detailed above have been operationalised for empirical studies that examine similarities and differences between interaction quality between dyads, and the quality of tutoring techniques.

Operationalising Dyadic Theories

Transactional models. Sameroff recognised that the transactional account of dyadic interactions would be difficult to operationalise. He identified that the barriers to

practical application were theoretical, logistical and methodological (Sameroff & Mackenzie, 2003).

In terms of theory, the main issue was how to assess a dynamic system; it is impossible to make assessments about one member of the dyad without taking account of the other, as their behaviour is always relative to the other's preceding behaviour. Logistically and methodologically, an operationalisation of the model requires the creation of coding schemes detailed enough to codify the many relevant domains of mother and child behaviours, at enough time-points throughout an interaction to assess qualitative change and bidirectional responses. However, Sameroff acknowledged that for such dense data per dyad, a researcher would need to sacrifice sample size (Sameroff & Mackenzie, 2003). He wrote: 'Under real life circumstances, the best we can do is description. Attributing causation to any element of the system always begs the question of the history of that element' (Sameroff & Mackenzie, 2003, p. 634). Lewis' metaphor of Escher's two hands drawing each other (Lewis, 2002) neatly describes this challenge; we cannot understand the progress of one without also accommodating for the contribution from and effect of the other.

Micro-developmental methods. Micro-developmental methodologies have emerged in the last few years to complement the traditional macro-developmental paradigms dominating child development research (see Lee & Karmiloff-Smith, 2002, for overview). These new approaches investigate qualitative change over a short period of time, typically within a single interaction. They also allow for the assumption that factors (mother personality, or child temperament, for example) may influence the individual or dyad at the *start* of a developmental transition differently to *after* incremental developmental change. These methods of coding have been used to observe

learning in a social context in tasks within the child's ZPD (see Lee & Karmiloff-Smith, 2002).

Operationalising Socio-Cognitive Learning Theories

Vygotsky. Vygotskian theories have rarely been operationalised for empirical study. His essays depicting naturally-occurring learning on a social plane did not explicitly directly invite further exploration. Vygotsky appears to consider the ZPD to be entirely conceptual, and not measurable; at no point does he recommend practices or methods for assessing a child's ZPD (Chaiklin, 2003). Vygotsky himself emphasised the child's *potential* ability (their ZPD) to be as valuable an indicator of their general ability as their current competencies. A child's *current* capacity (which Granott, 2005, labelled the *Zone of Current Development*, or ZCD) is easily observable and assessed, whereas some argue that the ZPD is unmeasurable (Chaiklin, 2003; Granott, 2005). This is not helpful for practitioners wishing to provide appropriate tasks for optimal learning (Granott, 2005); it seems that teachers may only know where a child's ZPD boundary was after the learning has already taken place. To address this, some researchers have developed dynamic assessments of individual ZPD (Brown & Ferrara, 1999; Lidz, 1987, Allal & Ducrey, 2000), which are designed to measure a child's potential, as recommended by Vygotsky.

Transition of regulation. The original transition of regulation account of social learning (Wertsch, 1979) was a direct application of Vygotsky's theories to a real adult-child dyadic learning experience. The application was entirely descriptive, and did not offer ways of reducing the complex descriptions into simpler schemes with which to observe many dyads, or over more than one task.

Given the extensive research literature on tutor-learner interactions, including the personal, social and demographic influences on the quality of the learning

experience, it is notable that there are so few attempts to codify and measure other-regulation and self-regulation in these studies. Wertsch's paper, and the term 'other-regulation', are often referred to, but rarely incorporated into methods to examine the interactions. Children's self-regulated learning style is a commonly measured characteristic within developmental psychology, but as the concept of self-regulation was borne from personality psychology, it is often measured in its 'trait' form (for examples, see Pino-Pasternak, Whitebread, & Tolmie, 2010; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009; Smith-Donald, Raver, Hayes, & Richardson, 2007).

My own literature searches yielded only one operationalised measure of other-regulation for interaction research, devised by Nader-Grosbois for studying quality of support for children with intellectual disabilities (Nader-Grosbois & Lefèvre, 2012; Nader-Grosbois, Normandeau, Ricard-Cossette, & Quintal, 2008). This coding scheme drew from literature identifying elements of self-regulated learning (identification of objective; exploration of means and planning; joint attention; behaviour regulation; attention; motivation; and evaluation), and created the tutor's other-regulation measures by making equivalent behaviours for each self-regulation feature (e.g., supports the child motivation or provides encouragement as an other-regulation equivalent to child's own self-regulated motivation; and helps the child evaluate their work as an equivalent to child's self-regulated evaluation). Beyond this, qualitative methods like co-regulated discourse analysis between tutors and university students (Hadwin, Wozney, & Pontin, 2005) have been utilised.

It is unlikely that the general absence of other-regulation measures in existing dyadic learning studies can be attributed to researchers' lack of interest in tutors' other-regulation; after all, Wertsch credited a child's mastery of a task as much to the adult as to the child. Instead, it indicates the challenges associated with creating a coding

scheme for maternal support, which captures not only adult behaviour but also the self-regulatory strategies the behaviour manifests.

Scaffolding. Due to the simplicity of the metaphor, and to the straightforward focus on the adult in the learning process, scaffolding has been the dominant theoretical foundation for empirical research into learning on a social plane. As such, theoretical and empirical work over the years has invited many adaptations and reconfigurations. As Susanne Lajoie put it, "Theory and research are extending our definitions of scaffolding, what it is, what we should scaffold, how we should scaffold, who or what should do the scaffolding and how we determine the effectiveness of such scaffolds" (Lajoie, 2005, p. 553). However, even slight nuances in different definitions of scaffolding have implications for how to measure it (see van Geert & Steenbeek, 2005, for example).

Wood and colleagues (Wood et al., 1976) identified six functions of scaffolding: recruitment, reduction of degrees of freedom, direction maintenance, marking critical features, frustration control, and demonstration. In some cases these functions are direct behaviours (e.g., demonstration); others are the intentions behind unspecified behaviours (e.g., reduction of degrees of freedom). Unlike both Vygotsky and Wertsch, Wood's categorisation was an incentive for others to codify the range of scaffolding behaviours, and many researchers have since developed methodological strategies. As a result, there is enormous variability in the different coding schemes, each with their own benefits and pitfalls.

First, some coding schemes are more fine-grained, and therefore more sensitive, than others. The extremities are rating a mother's scaffolding with a single code after watching the tutored interaction (e.g., Englund, Luckner, Whaley, & Egeland, 2004; Hammond, Mu, Carpendale, Bibok, & Liebermann-Finestone, 2012) to rating each

intervention made by the mother, and then create a combined score (e.g., Carr & Pike, 2012).

Second, the different scaffolding measures vary in the *sets of behaviours* they use. Whereas Wood et al.'s (1976) coding scheme included both means and intentions, most studies since have used either one or the other (Pol, Volman, & Beishuizen, 2010). For example, Hyde and colleagues (Hyde et al., 2006; Lindberg, Hyde, & Hirsch, 2008) specified particular behaviours (e.g., Notes errors or imperfect solutions; Demonstrates how to solve the problem); this provides parallels with the other-regulation coding scheme of Nader-Grosbois outlined above. Others code for the *intentions behind behaviours*, i.e. what aspect of development the child should improve on due to this adult intervention. For example, Pianta's coding schemes for maternal scaffolding consisted of scales for each of three general over-arching elements of scaffolding intentions: supportive presence, quality of instruction, and respect for child's autonomy (Pianta & Harbers, 1996; Pianta et al., 1991).

Third, schemes vary in how 'quantity' of a behaviour is established. Occasionally, this is measured in a tally format (Leerkes, Blankson, O'Brien, Calkins, & Marcovitch, 2011), producing a proportion of parental interventions during a task that were intended to assist the child (Robinson, Burns, & Winders, 2009). More commonly used is the measurement of levels; that is, showing low support at one end of the scale, and high support at the other. Some researchers use general level of each intervention, such as having 'no intervention' at one end of the scale, and 'demonstration' at the other end, with mid-range items including 'verbal questions' or 'verbal hints' (as used by Conner & Cross, 2003; Conner, Knight, & Cross, 1997; Pratt, Kerig, Cowan, & Cowan, 1988). More nuanced levels also exist; we can turn back to Hyde and colleagues' scaffolding coding scheme as an example. Each category of supportive behaviour had a

scale; for example for the behaviour category ‘Notes errors and imperfect solutions’, a 1-5 scale was used, from ‘Never points out errors’ to ‘Consistently points out errors’.

Fourth, scaffolding by its nature is not about quantity of support, but quality. That is, if some high-level support has been delivered, it would only be *scaffolding* if the level was appropriate for the child’s needs. In coding schemes in existing studies this is sometimes measured with a global scale of appropriateness of support provided. Hammond and colleagues’ (Hammond et al., 2012) scale spanned ‘parent gives no appropriate support’ to ‘parent provides consistent and appropriate support all of the time’ (for more examples, see Englund et al., 2004; Pianta et al., 1991).

More common than these global scales is a fine-grained approach, using the levels of adult behavioural intervention combined with child success scores. According to the *contingent shifting* principle, a tutor provides less support if the child is progressing, and more if the child is struggling, and some coding schemes have incorporated this. For example, Meins (1997) measured the type of behaviour displayed, the level of support of the behaviour, whether it was a response to the child’s request for help, and whether the level of the next instruction was an increase or decrease compared to the preceding intervention, corresponding with the child’s success or failure in between (see also Carr & Pike, 2012; Conner & Cross, 2003; Pratt et al., 1988). This method is more granular, and provides a proportion of *appropriate* versus *inappropriate* interventions as well as type and level.

Even with such wide-ranging coding schemes in the extensive literature, three conceptual issues emerge. One is that an overall ‘scaffolding’ score is produced for the mother at the end of the videotaped interaction. In some cases, this is the global score given after watching the whole video (either tally, or rating on a scale), and in others it is the mean of the appropriateness of all the interventions. While this is a theoretically

robust method of assessing between-family variance in scaffolding quality, reducing the unit of measurement in this way causes the loss of some interesting, and perhaps illuminating, information. According to the transactional model, interactions should be considered as dynamic, changing and fluctuating over the course of a task.

Further, just as the concept of scaffolding does not incorporate the child's input and effort, nor do the methodologies designed to measure it. In these coding schemes, children's actions are rarely examined for any purpose other than to gauge the effectiveness of a tutor's intervention.

Another observation about existing scaffolding scores is the vagueness of *inappropriate* scaffolding. Inappropriateness is rarely defined, and is not consistent across studies. Englund et al. (2004)'s scale of effective instruction described the opposite of effective scaffolding as 'unstructured and uninvolved'. On the other hand, another study described 'inappropriate support' as providing too much support and interference (Hammond et al., 2012). Essentially, these two papers describe inappropriate support as *either* under-support *or* over-support, but not both.

In describing the tutoring style of adults with deaf children, Wood outlines a type of inappropriate support he labels '*over*-scaffolding': "attempts to teach or help children that leave too little developmental space for the child to grow into" (Wood, 1999, p. 297). According to Wood, this sort of help as beneficial in the short-term, but "in the long term, they prove counter-productive and destructive" (Wood, 1999, p. 301). However, he does not describe whether *under*-scaffolding exists, what it might look like, or how it may have a different effect on child mastery during an interaction. As such, there is no platform upon which definitions of *over*- and *under*-scaffolding can be built and applied in actual observation studies. It is striking that, despite the variety of ways to measure scaffolding, and general agreement about what 'good' scaffolding looks like,

there is little consensus on how 'bad', ineffective scaffolding is described, identified, and measured. The socio-cognitive measures vary in many ways within this thesis, all as attempts to mitigate the issues described above.

This section has outlined the multiple challenges in defining and measuring the tutored learning process. This thesis explores socio-cognitive learning between mother and child, in the home context, in a topic that sits in the home-school overlap: homework.

Homework: an Interface between Home and School

Homework (supplementary schoolwork provided by the teacher to be completed outside school hours) has been under scrutiny by educationalists, politicians, teachers and families for the last fifty years. In the UK and USA, governmental policies tend to shift only marginally regarding when, and how much, homework should be set, and they consistently recommend that homework be considered a valuable addition to children's education from their entry into the school system (Gill & Schlossman, 2004). Homework policies are then interpreted at both a school and a classroom level, influenced by the preferences and beliefs of administrators, school governing bodies and teaching leaders. This means that there is substantial variability in how much and how often homework is sent home with the child, as well as what type of activities are set and how important it is to complete them (Cooper, Robinson, & Patall, 2006). With so much heterogeneity, researchers have questioned how these different factors may impact on the experience of homework for different families. Notably, however, less attention has been paid to how psychological and social factors – a child's personality, or home life – may also influence the homework experience.

Theories of the value of homework are manifold. It is believed to have a direct and relatively immediate educational impact, in that it serves to reinforce the learning

that has taken place in the classroom (Cooper & Valentine, 2001; Corno, 1996). Additionally, homework may have indirect learning effects, by providing the child with opportunities to develop and practise important self-regulation skills that are less called on in the classroom, such as self-motivation, putting time aside, staying on task, and evaluating accuracy and progress (Cooper & Valentine, 2001; Patall, Cooper, & Robinson, 2008; Ramdass & Zimmerman, 2011; Trautwein, 2007). These study skills are considered to be crucial for later academic success (Zimmerman & Kitsantas, 2014). Finally, homework is thought to be valuable for encouraging parental and home life involvement in formal education. In the first years of school, children cannot complete their homework alone, and parents play a larger role in homework with children at this age than with older children (Cooper et al., 2000). Parental involvement in education is crucial for a child's academic achievement (e.g., Epstein, 1987), but is highly influenced by multiple factors (including child's prior achievement, parenting styles, and SES factors: Desimone, 1999; Englund, Luckner, Whaley, & Egeland, 2004). Homework can be seen as a way to encourage parents to engage with their child's learning and education in their first school years, with the belief that multiple benefits would follow.

The *evidence* to support these theoretical benefits of homework is complex, contradictory and somewhat inconclusive. The diversity in terms of the researchers' academic backgrounds, the methods employed, and the journals targeted for publication make any integration of existing research challenging (Trautwein & Köller, 2003). Large-scale reviews and meta-analyses into the link between homework and school achievement have concluded that any positive academic effect is small, especially for younger children, and is susceptible to many confounding factors (Cooper et al., 2006; Cooper, 1989; Sharp, Keys, & Benefield, 2001; Trautwein & Köller, 2003; Trautwein,

2007). This, along with evidence of negative outcomes from homework (such as family conflict and anxiety: e.g., Solomon, Warin, & Lewis, 2002), has led some researchers and reviewers to consider homework a detriment to children's education rather than a benefit (e.g., Corno, 1996; see Marzano & Pickering, 2007). Furthermore, the assertion that homework helps children practise and refine their self-regulation skills is under-researched, and has only been partially supported in the evidence that does exist (see Hoover-Dempsey et al., 2001).

Evidence about parental involvement in homework is also complicated. Children tend to believe a homework session has gone better when a parent was involved than when they worked alone (Balli, 1997; Xu & Corno, 2003); thus, most children think that their parents are providing something extra when they help in homework. Furthermore, parental involvement in homework has been associated with increases in child self-efficacy (that is, confidence in one's own capacity and ability) in particular subjects for middle-school children (Williams, van Daal, Williams & Swift, 2015). However, the involvement by the parent during homework is also linked to tension and negative feelings from both parents and children around homework (Levin et al., 1997; Solomon et al., 2002). Some research finds the benefits of parental involvement in homework is evidenced throughout school years (Núñez et al., 2015), other studies only found the benefits exist in younger children (Gonida & Cortina, 2014; see for review Patall et al., 2008). Overall, and of significance to this thesis, it appears that the quality, rather than the quantity, of parental help in homework is key to reaping the benefits of their involvement (Balli, Demo, & Wedman, 1998; Fan & Chen, 2001; Hoover-Dempsey et al., 2001; Patall et al., 2008; Pomerantz, Moorman, & Litwack, 2007).

Essentially, parents are required to be the 'teacher' during homework if their child needs it, in lieu of an actual teacher. Many parents report that they find helping

during homework difficult, because they don't know how best to help (Epstein & Lee, 1995). Given the heterogeneity of how homework is set, and lack of consistency in existing findings, this is not surprising. What has been established is that parents may contribute to a better homework experience by providing the child with some very particular support, outlined below.

First, parents can help the child remain positive during homework; they play an important role in modelling positive behaviours during difficult points in the task, which improves the learning atmosphere (Pomerantz, Wang, & Ng, 2005). Second, parents can create an environment more conducive to learning. Unlike the classroom, the home environment is not designed for structured learning, and for children is a space disconnected from formal education. Thus, while the home may not provide ideal conditions for successful homework, parents can help their children by adapting the environment, such as clearing space, turning off the TV, and allocating time for the child (Xu & Corno, 2003). Finally, and most importantly for this thesis, if the homework experience is to be a useful time to practise self-regulated learning, then young children – whose self-regulation skills are underdeveloped – require the parents to provide high-quality cognitive support.

While maternal tutoring strategies during homework have rarely been examined in fine detail, evidence suggests that the homework experience is affected by the use of particular overarching tutoring styles. Parents' self-reports of how much they encourage independence during homework has positive academic outcomes (Cooper et al., 2000; Gonida & Cortina, 2014), while over-involvement can have a negative effect (Ng, Kenney-Benson, & Pomerantz, 2004). This shows that the quality of the tutorial support by the parent can help the child gain from the potential theoretical benefits of homework. It is important to keep in mind, when considering parental tutoring, that

tutoring support during homework will not always be delivered in an optimal way: borrowing Tharp and Gallimore's phrase, homework is part of the "informal pedagogy of everyday life" (1998, p. 93). The wealth of research into how personality and inter-relational factors affect maternal tutoring strategies opens up an enquiry into which characteristics of the mother and the child play an important role in the tutorial experience during homework.

Another challenge facing the endeavour of researching homework on a family level is that many parents share the workload between them, in ways that vary between families. Even within the family, they may set up *which* parent provides help according to which child needs it (in families of two or more children), what the homework subject matter is, and which parent is more available at the time. All of this undermines the 'controlled' environment that scientific studies require – a given mother-child homework interaction may not be 'typical'. It appears that mothers and fathers deliver support during homework in different ways (Murray, Woolgar, Martins, Christaki, Hipwell & Cooper, 2006), and thus may go on to affect the child's learning in the homework context in differing ways too.

In his large research synthesis in 1989, Cooper concluded that "… homework probably involves the complex interaction of more influences than any other instructional device" (Cooper, 1989, p. 87). Twenty-five years on, we are still trying to map these influences, and this thesis aims to contribute to this endeavour. The many theoretical benefits of homework may only be felt in practice under particular conditions, often attributed to the parent and the quality of their involvement, especially in the early school years.

The Current Thesis

The aims of this thesis included:

- To focus on homework and school adjustment as functions (and products) of the 'overlapping spheres' of home and school
- To tease apart the respective influences of maternal beliefs and personality, and child temperament, on both academic and non-academic tutored tasks
- To view mother-child interactions from affective, cognitive and bidirectional perspectives
- To incorporate individual, dyadic and contextual factors on child home learning experiences and school

There were also three methodological aims:

- To pilot a new fine-grained coding scheme applying operationalised regulation transition perspectives to tutored interactions
- To develop a coding method for scaffolding which distinguishes between different types of inappropriate support
- To pilot using children's genuine homework for research into homework interactions

To address these aims, two datasets were analysed. Most of the research reported in this thesis was from a short longitudinal study I conducted. This involved 85 Year 1 children and their mothers, mainly from South-East England, recruited through existing participant databases and advertisements (see Appendix A for recruitment poster and leaflet). Over five months I visited each family after school or at weekends and in holidays, and collected data from questionnaires and interviews, as well as video data of the mother-child dyad doing joint tasks. A year later, I visited eighty of them again for a

follow-up data collection (*M* gap between first and second visit = 368 days, range = 319 – 478 days; for information sheets, see Appendix B). On the follow-up visit, the mothers and children again took part in questionnaires and interviews, and were videotaped doing more joint tasks (the full list of measures collected at both time points is in Appendix C). Data from the first visit were used in Papers 1 and 2 of this thesis, and Paper 3 reports analyses of data from both visits. Paper 4 used data at a single time-point from a pre-existing longitudinal data set collected for the Sisters and Brothers Study (SIBS: Pike, Coldwell, & Dunn, 2006). Mothers, rather than fathers, were the parent of interest in these studies, as most existing research informing the hypotheses have focused on mother-child interactions. Additionally, given Murray et al. (2006) observed that maternal homework help had a greater effect on child outcomes than paternal homework help, I anticipated that observing mothers may yield more pronounced findings for the papers focusing on homework. The methods used in this study were primarily looking at within-family differences (by looking at differences between the mother's and child's behaviour on different tasks or at different time-points), to mitigate the potential of a genetic component interfering with the aims' highly environmental focus.

Paper 1: Child Temperament and Home Environment Relate to Different Aspects of 5-6 Year Olds' School Adjustment

School adjustment in the first few years is a very appropriate aspect of children's development to focus on through an 'overlapping spheres' lens. It taps into multiple aspects of the child's social and emotional growth, exploring both their enjoyment of school (the pleasure they take from being in that environment), and their beliefs in themselves as able students. Before children start school, they have had years of growing in the home, and the diverse influences on them during these years either equip

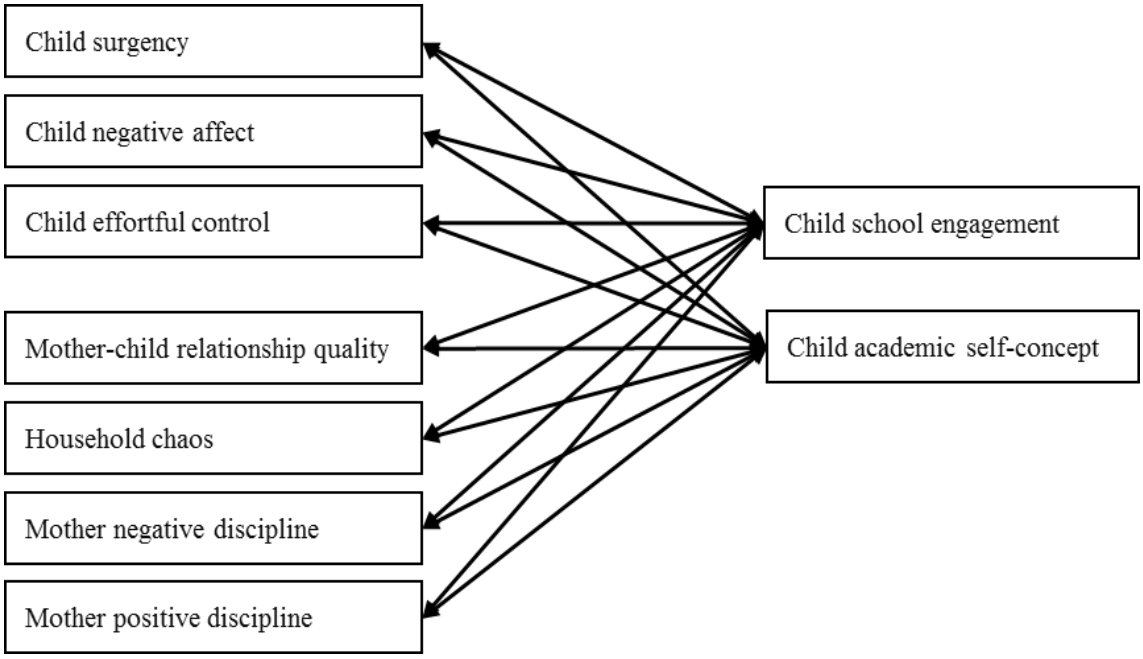
them for entry into a new microsystem, or to cause them to struggle. The theories behind this first paper are primarily Bronfenbrenner's and Belsky's, looking at different mother, child and context factors across different environments within the microsystem.

To capture the children's home environment, I measured three different dimensions of home and family life: household chaos, maternal discipline style, and mother-child relationship quality. *Household chaos* is a measure of the noise and order in the day-to-day atmosphere of the home (Matheny, McCartney, Bub & Marshall, 1995). Scores of this measure has related to children's physical development, but the impact on their psychological development is also strong. Chaos disrupts routines and predictability in the home, and has been found to have a long-lasting, and wide-reaching, effect on multiple aspects of child development (Deater-Deckard, 2015). While often associated with households of a lower socio-economic status, it has also been identified in families of different income and education positions (Deater-Deckard, 2015). As adults are in charge of the home, chaos is imposed on the child (whether for reasons of socio-economic stress or lifestyle choices). *Discipline style* was also included as an indicator of home life. Despite links with household chaos (e.g., Atzaba-Poria & Pike, 2008), it captures a distinct quality of atmosphere in the home. Belsky credited discipline as an important aspect of general parenting style. My third measure was *mother-child relationship quality*, which encapsulates the emotional climate with the primary caregiver. The benefits for the child that a positive relationship with the mother provides may spill over into positive beliefs and behaviours beyond the family microsystem; evidence confirms that the positive effects of a good quality mother-child relationship extend into school and the classroom (Pianta, Nimetz, & Bennett, 1997; Simpkins, Weiss, McCartney, Kreider, & Dearing, 2006).

Since Bronfenbrenner's framework acknowledges that individual differences between children also play a role, I included measures of child temperament as potential correlates of school adjustment. This was to tease apart how much of their capability to adjust into a new environment was a function of their character, and how much was attributable to the home 'sphere'.

Figure 1.8

Visualisation of correlations to be tested in Paper 1



Paper 2: Comparing Apples and Oranges? Investigating the Ecological Validity of Extrapolating Homework Behaviour from Non-Homework Observations

The second paper goes into more specific elements of the home environment. While Paper 1 examined maternal reports of multiple home-life factors, this second study used observation techniques to look at family dynamics during interactions, adding the transactional model of development to the theoretical basis established in Paper 1. Here I turn to the topic of homework, as genuine homework interactions have been under-researched. Wood and Wood (1999) commented that interaction styles and quality should not be generalised based on one observation of a single task. This led me to query whether the pressures and associations attached to homework may bring out different behaviours compared to other tasks, and when researchers use a 'proxy' homework task, they may be comparing apples with oranges. With this in mind, the mothers and children who took part were observed doing the child's genuine homework, followed by an Etch-A-Sketch task that was identical for each participating family.

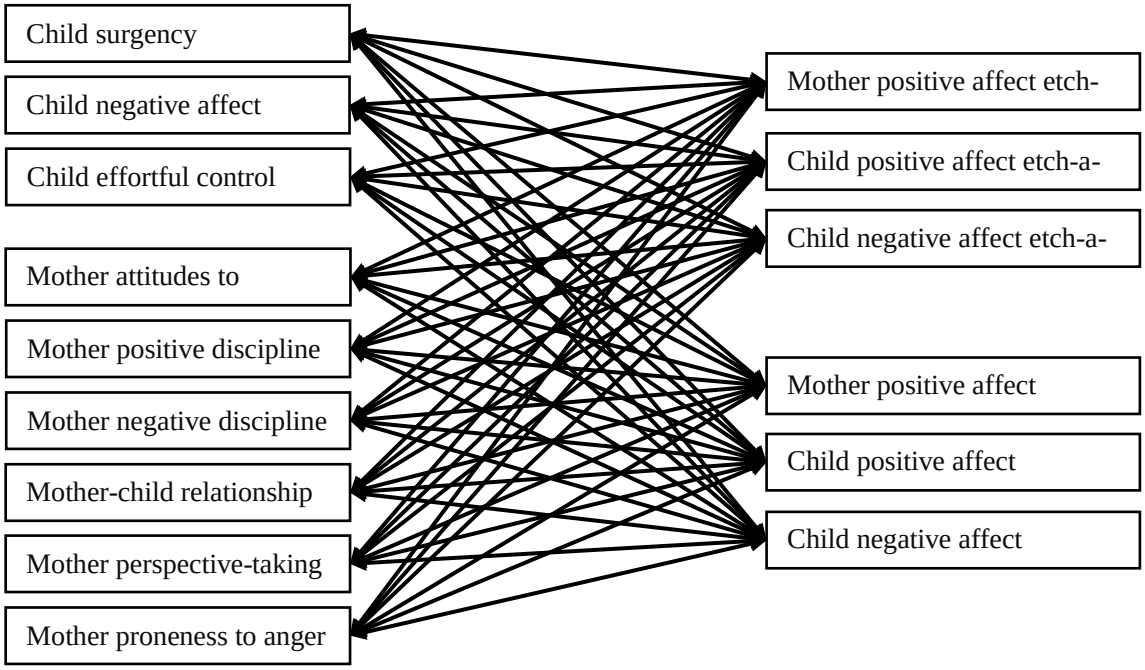
I focused on the displays of positive and negative affect from mother and child. The psychological bases behind maternal displays of emotion are manifold, with a desired aim of improving the child's experience. First, emotion displays can be the emotional-supportive side of maternal tutoring (Pomerantz et al., 2005), which has been associated with pre-academic skills (Leerkes et al., 2011), motivation and interest in the task (Pomerantz et al., 2005), mastery orientation and self-beliefs (Hokoda & Fincham, 1995; Richman & Rescorla, 1995), and self-regulation (Pino-Pasternak et al., 2010). Second, maternal positivity during an activity may transfer to the child, modelling emotion regulation and reinforcing pleasant associations with the task (Else-Quest, Hyde, & Hejmadi, 2008; Pomerantz et al., 2005; Salonen, Lepola, & Vauras, 2007; Xu & Corno, 2003). Maternal negative affect appears to have links to less desirable

outcomes for the child, such as a drop in motivation (Pomerantz et al., 2005) and even depressive symptoms (Kenney-Benson & Pomerantz, 2005). The reasons behind children's emotion displays during a task are different to their mother's; they are often attributed to an outward expression of their inner state: pleasure, joy, confidence, uncertainty, frustration or boredom. However, children's emotion displays are more than just manifestations. A child's positive affect during a task has beneficial effects for that child (Else-Quest et al., 2008; Knollmann & Wild, 2007); in parallel, children who experience more negativity during a task tend to avoid and disengage with similar tasks in the future (Leone & Richards, 1989).

Interaction and parenting theories suggest that the personality of the parent as well as the child influence the type and quality of their interactions (Belsky, 1984; Sameroff & Chandler, 1975). To address this, I included measures of maternal personality that could be pertinent to her displays of affect, as well as the child's, as I did in Paper 1. Maternal perspective-taking and proneness to anger were included in this analysis. Mothers with a better capacity to understand another person's experience may be more likely to recognise the value of her displays of positivity for her child's experience when working on a task together, and therefore do more of it. Mothers who have a self-reported 'short fuse' may be just as able to take others' perspectives, but less able to adjust their behaviour in a way that would benefit the other (i.e. display less negative affect during a task). In parallel, the child's personality may also have a bearing on their own, and their mother's, affect in terms of the behaviour they display and elicit (according to the transaction model). As with Paper 1, I also included maternal discipline and mother-child relationship quality, to accommodate for the familial climate that may have a bearing on any interactions.

Figure 1.9

Visualisation of correlations to be tested in Paper 2



Paper 3: Do Maternal Beliefs Predict Scaffolding Quality during Young Children's Homework? A Longitudinal Observation Study

Paper 3 moved from the affective side of maternal support and into more pedagogical principles, drawing on the sociocognitive theories for the first time (specifically Wood's scaffolding theory). With the focus remaining on homework, I examined the variance of scaffolding quality between mother-child dyads. As scaffolding has been found in a range of research to be an effective tool for tutoring in non-homework tasks, we can extrapolate that it would also be valuable for homework. Scaffolding during homework is worthy of attention: in Key Stage 1, children need adult supervision in homework completion, and the tutoring quality of that supervision,

from a person who may not be naturally skilled at teaching, may affect whether the benefits of the experience are felt – and this may have implications for future homework experiences.

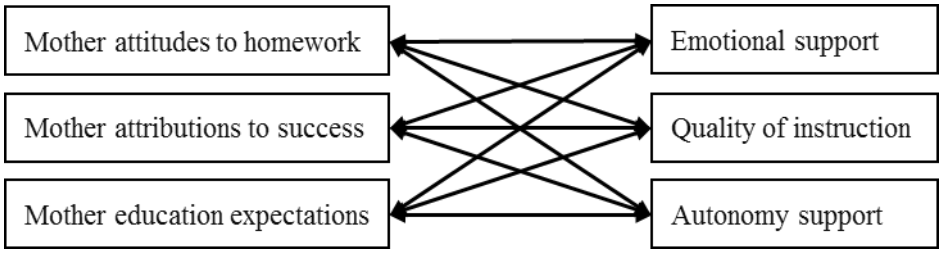
The video recordings of two interactions a year apart provided me with a longitudinal perspective. The earlier interaction, the Etch-A-Sketch videos used in Paper 2, were coded for scaffolding so that I also had information on mothers' scaffolding style during non-academic tasks, as a sample of the scaffolding the mother has delivered in the dyad's shared history. The later interaction was homework, which was coded using a traditional scaffolding coding scheme, so that I had information on her scaffolding quality during a typical homework interaction with the target child. I used the opportunity of having two scaffolding interactions to devise a coding scheme for the Etch-A-Sketch videos that had greater precision about 'inappropriate' scaffolding. As previously outlined, scaffolding requires just the right amount of support for the child, and neither too much nor too little help at any given point in the task; thus, an ineffective scaffolder could tend to deliver too much or too little help. I created and piloted a 'Goldilocks' scaffolding coding scheme, measuring when the support was 'just right', and when it was too much or too little for the child's current and immediate needs. This earlier *over*- or *under*-scaffolding could then be compared to later homework scaffolding, to ascertain whether either sub-optimal scaffolding style was specifically related to later scaffolding during homework.

Sameroff included maternal beliefs and attitudes in his analysis of maternal factors in the transactional nature of dyadic interactions (Sameroff & Mackenzie, 2003), and these factors, especially beliefs about education, are pertinent to the research focus of homework, which it is such a divisive and emotionally-charged topic within and across families. Thus, I extended maternal factors in this paper to maternal beliefs.

Specifically, I captured mothers' self-reports (from the earlier time-point) of their attitudes towards homework, their attributions to success at school, and their academic expectations for the target child. I used the scaffolding scores from the Etch-A-Sketch videos at that same time-point as a control, so as to isolate the relationship of these beliefs on later homework scaffolding specifically.

Figure 1.10

Visualisation of correlations to be tested in Paper 3



Paper 4: Scaffolding under the Microscope: Applying Self-Regulation and Other-Regulation Perspectives to a Scaffolded Task

Paper 3 addressed maternal scaffolding during homework, and one of the roles homework is thought to have is helping children develop important self-regulated learning skills. Thus, the role of the mother in tutoring situations could be understood to be as the *other-regulator* in Wertsch's concept of the transition of regulation. This other-regulation can be contrasted against the child's self-regulation development

during a tutored interaction. In this final paper, I used the existing data set from the SIBS study to draw together the transactional model of interactions and concepts of tutoring at home. Scaffolding in Paper 4 returns to the basic theoretical underpinnings of learning on a social plane. The study involved observing a joint problem-solving task through Wertsch's conceptual lens, rather than the more common scaffolding lens. Wertsch (1979) described the ideal outcome as reaching mastery of the task (i.e. moving through the ZPD), as well as developing a refined skill set to apply to other similar tasks. While mastery is occasionally assessed in scaffolding literature, improvements in particular self-regulatory behaviours tend not to be examined; and it is certainly plausible that a child might reach the end of the scaffolded interaction having shown stable, or even diminishing, self-regulation while receiving effective scaffolding throughout. Paper 4 directly addressed the child's contribution to, and effort within, a dyadic interaction, which has so often received minimal attention in interaction research.

An observational scheme to extract this information required coding of different self-regulated behaviours from both mother and child at multiple time-points throughout the task, as the child moves through the ZPD. I used videos of a multi-trial task which increases in difficulty from trial to trial to examine changes over time. As coding schemes to measure self- and other-regulation are relatively novel in the research field, I adapted an existing coding scheme to measure change in level of self-regulation dimensions after each trial.

Unlike the interaction coding in Papers 2 and 3, this scheme allowed for more granular, and detailed, mapping through the ZPD. Extracting exemplar families from the data set, I scrutinised multiple patterns of change over the course of the task in both mother's other-regulatory behaviour and child's self-regulation, in order to illuminate the variation in regulation transition styles during scaffolding interactions.

Chapter 2:

Paper 1 - Child Temperament and Home Environment Relate to Different Aspects of 5-6 Year Olds' School Adjustment

Abstract

Early maladjustment to school life predicts multiple negative educational and life outcomes. However, existing research into predictors of adjustment rarely differentiate between indicators of adjustment, such as engagement in school, and academic self-concept. Our study examined whether these different measures are distinct or related, and whether they are associated with child and family characteristics in comparable or contrasting ways. Eighty-five 5-6 year old children (43 boys) in South-East England were interviewed using puppets about their engagement in school and their beliefs about their own academic competence. Their mothers completed questionnaires about their temperament and aspects of home life. The two dimensions of school adjustment were found to modestly positively correlate, suggesting they were related but distinct. Child temperament related to their self-reported engagement (particularly surgency, which uniquely predicted lower engagement), but not their competence beliefs. In contrast, home life factors (household chaos, parenting style and relationship quality) were associated with the children's beliefs about their academic competence but not their self-reported school engagement. These findings shed further light on the complex interplay between social and individual factors during early school years that have a bearing on child's adjustment to school life.

Introduction

Multiple negative educational outcomes, such as school dropout, low attainment and delinquency, have all been attributed to the child's initial adjustment to school (defined loosely as successful psychological adaptation to the school environment) (Chamorro-Premuzic, Harlaar, Greven, & Plomin, 2010; Miserandino, 1996; Perry & Weinstein, 1998; Spinath, Spinath, Harlaar, & Plomin, 2006). As such, school adjustment has been the focus of theoretical and empirical enquiry for decades, capturing the attention of psychologists, educationalists and policy-makers. Adjustment at an early age follows the child through school and into adolescence (Ladd & Price, 1987), so identifying those with low adjustment at the start of their school experience, and establishing factors which may predict this trajectory, is important. However, there are gaps in current knowledge. Older children are most frequently studied, and from there we cannot answer questions about school adjustment as it emerges. Additionally, research rarely differentiates between distinct dimensions of school adjustment. To further understand the complex nature of school adjustment and its correlates, this study differentiates between two distinct indicators of school adjustment, engagement and academic self-concept.

Dimensions of School Adjustment: Engagement and Academic Self-Concept

While the majority of research into school adjustment uses a single, general definition of adjustment, two indicators are commonly used in measurement: school engagement and academic self-concept. Engagement, which is a liking for and active involvement in school (e.g., Birch & Ladd, 1997; Ladd & Price, 1987; Skinner & Belmont, 1993), encapsulates the child's behaviours and attitudes associated with the school environment. This indicator has been used by many researchers (including Appleton, Christenson, & Furlong, 2008; Fredricks, Blumenfeld, & Paris, 2004;

Reschly & Christenson, 2012), and has been associated with a range of outcomes, including academic achievement (Connell et al., 1994; Fredricks et al., 2004), school dropout (see Appleton, Christenson, & Furlong, 2008) and even negative consequences beyond education, such as risky health behaviours (Carter, McGee, Taylor, & Williams, 2007). Other research has focused on academic self-concept as an indication of school adjustment (Bong & Skaalvik, 2003; Guay, Marsh, & Boivin, 2003; Miserandino, 1996; Muijs, 1997; Perry & Weinstein, 1998; Spinath et al., 2006). Academic self-concepts, the personal beliefs in one's own scholastic competence, are "key causal determinants of a variety of achievement behaviors" (Eccles, 1983, p. 82), and relate to motivation in school (Connell, 1991; Harter, 1982) and academic achievement (Guay et al., 2003; Muijs, 1997). Indeed, they are predictive of positive school outcomes even when taking into account *actual* scholastic ability (Miserandino, 1996; Spinath et al., 2006).

Given that these two aspects are both used to measure the psychological state of school adjustment, it is surprising that they are rarely studied alongside each other, although the few studies which have incorporated both find that they co-occur (Fredricks et al., 2004; Miserandino, 1996). We anticipated that these two dimensions of school adjustment would be related but distinct, as would be evidenced by a modest to moderate correlation.

Adjustment in the First Years of School

Assessing child school adjustment at the onset of school is essential for identifying how and from where the crucial beliefs and behaviours of engagement and self-concept are shaped. Cowan and colleagues note that "kindergarten provides an ideal beginning platform from which to survey children's educational strategies" (Cowan et al., 1994, pp.78). Despite this, most studies involve participants beyond kindergarten years, which leaves many questions unanswered about the precursors of school

adjustment (Cadima, Doumen, Verschueren, & Buyse, 2015; Reschly & Christenson, 2012). Reports by the teacher about the child's adjustment to kindergarten are often used, which has multiple limitations (Perry & Weinstein, 1998) and does not capture the child's own attitudes, preferences and beliefs. Measuring adjustment through self-reports at such a young age has historically been challenging (Appleton et al., 2008; Entwisle, Alexander, Pallas, & Cadigan, 1987; Fredricks & Eccles, 2002; Stipek, 1981). However, interview techniques designed to measure young children's beliefs and thoughts have emerged in the literature (Harter & Pike, 1984; Heagle, 2015; Measelle, Ablow, Cowan, & Cowan, 1998; Skinner & Belmont, 1993), which can validly assess self-beliefs in both academic self-concept and school engagement of kindergarten-aged children.

Potential Influencing Factors on Early School Engagement and Academic Self-Concept

In recent years the focus of school adjustment has shifted from consequences of school adjustment to predictors of variation, but these predictors remain under-explored (Cadima et al., 2015). Existing research paints a complex and sometimes inconsistent picture, especially as some adjustment studies use engagement as an outcome measure, and others use academic self-concept. However, it appears that adjustment may be influenced by multiple factors in a child's early life, as detailed below, which we hypothesise will relate to school engagement and academic self-beliefs.

Child temperament. As certain temperamental propensities are critical to behaviours suited to the classroom, some temperamental profiles may be a better fit to school, and adapt to the demands of the classroom better than others (Al-Hendawi, 2013; Rimm-Kaufman et al., 2009; Vitiello, Moas, Henderson, Greenfield, & Munis, 2012). Temperaments, and social and behavioural traits (for example shyness, effortful control,

impulsivity) have been linked to school adjustment generally (Coplan, Arbeau, & Armer, 2008; Klein, 2015; Mudrick, 2015) and also specifically to both school engagement (Cadima et al., 2015; Valiente, Swanson, & Lemery-Chalfant, 2012; Yang & Lamb, 2014) and academic self-concept (Nelson et al., 2009). We anticipated that temperament would be related more strongly to school engagement than to academic self-concept, as a temperamental *fit* to the classroom would affect a child's enjoyment of the school experience.

Maternal parenting style. Family processes may give rise to a child's ability to adapt to a different environment and social system (see Cowan, Cowan, Schulz, & Heming, 1994); consistent with this, there are associations between school engagement and parenting styles and behaviour (Estell & Perdue, 2013; Reschly & Christenson, 2012; Steinberg et al., 1992). The mother-child relationship may be especially important for the child's healthy academic self-concept at the start of school, given that self-concept development is rooted in social sources (Bong & Skaalvik, 2003) and stems from attachment security and positive relationships with caregivers (Connell, 1991). In light of this, we assessed whether an association exists between aspects of the home environment and emerging engagement and academic self-beliefs at the start of school.

Home context. We also wished to investigate whether the home context, particularly household chaos, relates to adjustment in the first few years of school. A home life with little structure and routine has been associated with many negative child outcomes (Deater-Deckard, 2015), including behaviour problems (Coldwell, Pike, & Dunn, 2006) and cognitive development delay (e.g., Evans, Kliewer, & Martin, 1991). Children may be adversely affected by noise at home because they are overstimulated, and by filtering out unwanted stimuli they may overcompensate and filter out relevant information (Evans et al., 1991). Thus, children who live in a noisy, chaotic and

unstructured environment may not have the resources to practise good learning and concentration skills they can then use at school. To date, no empirical studies have investigated this, though some authors have hypothesised that there may be a connection between household chaos and academic self-concept, as structure provides the child with opportunities to meet their basic psychological needs (Reschly & Christenson, 2012).

Given the strong theoretical basis that self-concept is shaped by social and environmental factors, we anticipated that academic self-concept in the first years of school would be associated more strongly with home life and family relationships than with the child's own temperament.

Current Study

This study set out to further our understanding of school adjustment and associated factors at the start of school. Using these two commonly-used indicators of adjustment (school engagement and academic self-concept) measured through Year 1 children's self-reports, we aimed to test the following hypotheses:

1. Children's school engagements correlate with their academic self-concept
2. Children's temperament relates to their engagement, whereas their home and family environment relates to their academic self-concept.

Method

Participants and Recruitment

The majority of participating families were recruited from a database of mothers who had either taken part or shown interest in developmental psychology studies when their child was an infant five years previously. One hundred and seventy-six mothers of Year 1 children were contacted via the email address they had provided; however some contact information was out-of-date. Sixty mothers (71%) were recruited for the study

this way. A further ten mothers (12%) were recruited after responding to posters in local toy shops, book shops and supermarkets, and adverts on local parent forums. Participating mothers also helped recruit the final fifteen families (18%) via word of mouth. Ethical approval for the study was obtained from the university's research ethics committee.

Eighty-five children (43 boys) and their mothers took part in the study. The children's mean age was 73 months (*SD* = 3.23), ranging between 65-80 months. Fifty children (59%) had one sibling, and twenty (23%) had two or more. Fifteen (18%) were only children. The sample was predominantly white British in ethnicity; one of the children was Black, and four (5%) lived in bilingual homes with one parent of European (but not British) or Eurasian descent.

Procedure

Mothers and children were visited in the family home after school or during the weekends or holidays. The dyad took part in some joint activities, which were not included in this study. Half-way through the visit, the child took part in two activities with the researcher, in a separate room from the mother: the British Picture Vocabulary Scale 3 (BPVS 3) and the Berkeley Puppet Interview (BPI) technique, which was audiotaped for later coding. Meanwhile, the mother was given a questionnaire to complete. After all the tasks were complete, the child received a certificate and a bookmark.

Measures

Verbal IQ. The BPVS 3 (Dunn, Dunn, & Styles, 2009) measures receptive vocabulary, and was used as a proxy for verbal mental age. As child's age and BPVS score were found not to correlate (.192, *p*=.12), standardised scores (raw scores

accommodating for age) were used. The standardised score average for the population is 100; the mean for the children in this study was 107 (*SD*=8.74).

Mothers' level of education. We used Natriello & McDill's (1986) item on the highest level of education reached by the mother, adapted for the British education system (see Appendix D). Seven pre-coded responses, ranging from 'left school without GCSEs' to 'finished doctoral degree (Ph.D)' were provided. Mothers came from relatively middle-class socio-economic backgrounds, with forty-two (50%) having obtained an undergraduate degree and a further twenty-five with postgraduate qualifications. Seventeen (20%) of the mothers' highest qualifications were GCSEs or A-Levels.

Child's school competence and academic self-concept. The Berkeley Puppet Interview method (Measelle et al., 1998) is an interview technique for young children, which gains insight into their opinions, perceptions and beliefs. Two identical puppets used in the interview pose eight opposing statements on school engagement (e.g., 'I think learning to read is boring', 'I don't think learning to read is boring'; 'I like school', 'I don't like school') and twelve on academic competence beliefs (e.g., 'other kids are smarter than me', 'I'm smarter than other kids'; 'I do a good job on my schoolwork', 'I don't do a good job on my schoolwork') (Ablow & Measelle, 1993). The order of the questions, and attribution to the two puppets, were randomised. The choices were then coded by the first author on a scale of 1 to 7, with 2 being agreement with the puppet expressing a negative view, and 6 being agreement with the puppet with a positive view. Scores of 1 and 7 were for answers by the children that had a stronger valence than the puppets' statements (e.g., if a child answered 'I'm the smartest kid in the world', they would be rated as a 7). Scores of 3 and 5 were used for answers that were slightly in agreement with one puppet (e.g., if a child answered 'I think maybe I'm a little bit

smarter than most of the other kids', they would be coded as 5). The code of 4 was used when a child would not agree with either statement more than the other. These two scales had adequate internal reliability, α=.75 and .76. Fifteen (17.6%) of the interviews were double-coded by a Psychology undergraduate student, and inter-rater reliability, using a two-way mixed absolute-agreement ICC (Hallgren, 2012), reached an acceptable .78 (Cicchetti, 1994). The interview questions can be found in Appendix E.

Child temperament. Mothers completed the Child Behavior Questionnaire, Very Short Form (Putnam & Rothbart, 2006), a scale consisting of 36 items that load onto three temperament factors: surgency (impulsivity, activity level, shyness [reversed], high intensity pleasure), negative affect (anger, discomfort, sadness, soothability [reversed], fear) and effortful control (inhibitory control, attention focusing, perceptual sensitivity, low intensity pleasure). The short form has been found to have good internal consistency and longitudinal stability in young children (Putnam & Rothbart, 2006). Items consisted of statements (e.g., 'Is quite upset by a little cut or bruise'), which the mother scored on a 7-point Likert scale (1 = extremely untrue, 7 = extremely true) according to how much the statement represented her child. The subscales reached adequate reliability, with alphas of .77, .77 and .74 respectively. This scale can be found in Appendix F.

Parenting and parent-child relationship. The mothers' questionnaire contained the Parenting Scale taken from the Parent and Family Adjustment Scale (PAFAS: Sanders, Morawska, Haslam, Filus, & Fletcher, 2013 - see Appendix G). This scale measures level of dysfunction in both parenting practices (17 items) and parent-child relationship (11 items). Mothers rated how true statements were, such as 'I argue with him/her about their behaviour or attitude' on a 4-point Likert scale, ranging from 1 ('Not at all') to 4 ('Very much'). Reliability on these two scales was found to be

inadequate, and so factorial analyses were conducted to create suitable constructs within the subscale. The parenting practices subscale yielded two separate factors, which the authors agreed reflected constructs of positive discipline (seven items, e.g. 'I send him/her to time out [e.g., sit alone in a quiet place) when he/she misbehaves') and negative discipline (six items, e.g., 'I give in and do a task myself if he/she does not do what I ask'). The positive discipline factor showed sufficient reliability, α=.71, and while the reliability of the negative discipline factor was low (α=.56), the authors felt that it had construct validity, and was relatively independent of the positive discipline factor (r=-.16, p>.05) and so it was included in subsequent analyses, whereby a high score indicated high rates of positive or negative discipline. The ten items of the parent-child relationship subscale were analysed similarly, as it also showed low internal reliability with α=.58, and yielded one factor of nine items (e.g., 'I enjoy spending time with him/her'), with a more acceptable reliability of α=.70. A higher score indicated a higher-quality relationship.

Household chaos. Mothers completed the Confusion, Hubbub And Order Scale (CHAOS: Matheny, Wachs, Ludwig, & Phillips, 1995 - see Appendix H), where the mothers rate on a 5-point Likert scale (1 = definitely untrue; 5 = definitely true) how true six statements about the home environment are (such as 'It's a real zoo in our home'). This scale reached acceptable internal consistency in our sample, α=.66.

Results

Preliminary Analysis

Means and standard deviations for all study measures are displayed in Table 2.1. Child age did not correlate with any other variable. Independent-samples t-tests revealed no gender differences on any variable, p>.05 in all cases. Due to some variables not being normally distributed, correlations between all variables, bootstrapped with 1,000

samples and bias-corrected acceleration, were performed. Bootstrapping creates simulated replications of the data, and analyses them by producing confidence intervals, which are interpreted in parallel with *p*-values for demonstrating statistical significance (du Prel, Hommel, Röhrig, & Blettner, 2009; Efron, 1987). The bootstrapping method, as an addition to traditional significance testing, is recommended for many aspects of psychology research, including education, where low participant numbers may inflate the Type 2 error (Higgins, 2005) and the output may be undermined by non-normal distributions (Mooney & Duval, 1993). Inter-correlations for all variables can be found in Table 2.2. In cases where the significance is borderline, confidence intervals are reported.

Table 2.1

Means, standard distributions and ranges of all variables

Factor	Mean (*SD*)	Range (scale range)
Maternal questionnaire		
Mother education level	4.98 (1.06)	2-7 (1-7)
Child surgency	4.31 (.88)	2-5.67 (1-7)
Child negative affect	4.13 (.94)	2-6.92 (1-7)
Child effortful control	5.42 (.74)	3.67-6.83 (1-7)
Positive discipline	3.17 (.49)	1.57-4 (1-4)
Negative discipline	1.74 (.36)	1-3.33 (1-4)
Relationship quality	3.74 (.26)	2.67-4 (1-4)
Household chaos	1.99 (.59)	1-4 (1-4)
Puppet interview		
Child school engagement	5.19 (.99)	2.38-6.38 (1-7)
Child academic self-beliefs	4.80 (.87)	2.58-6.08 (1-7)
Researcher assessed		
Age (months)	72.7	65-80
Verbal mental age	106.6 (8.74)	81-129

Table 2.2

Inter-correlations between child temperament and home environment variables

		1	2	3	4	5	6	7	8	9	10
Control variables											
1.	Age (months)	-									
2.	Verbal mental age	-.07	-								
3.	Maternal education	.-19† (-.37, -.02)	.26* (.07, .43)	-							
Child temperament											
4.	Child surgency	.14	.20	-.08	-						
5.	Child negative affect	.03	.01	-.04	-.32** (-.48, -.11)	-					
6.	Child effortful control	-.10	.26* (.05, .44)	-.01	-.07	.13	-				
Home environment											
7.	Positive discipline	-.12	-.18	-.09	-.12	.18	-.12	-			
8.	Negative discipline	.03	.01	-.07	-.13	.33** (.11, .50)	-.14	-.17	-		
9.	Relationship quality	.02	.05	.10	.03	.05	.20† (.03, .38)	.42** (.18, .62)	-.34** (-.49, -.09)	-	
10.	Household chaos	-.12	-.11	-.08	.09	.10	-.11	-.12	.34** (.16, .49)	-.36** (-.56, -.13)	-

Note. Bivariate two-tailed Pearson correlations, bootstrapped with 1,000 samples and bias-corrected accelerated confidence intervals. *p<.05 **p<.005

†Correlations where the p-values are over the .05 threshold, but the confidence intervals do not cross zero.

Child surgency and negative affect correlated substantially, suggesting that these two characteristics are often observed together; the more bold and energetic a child was, the less emotionally sensitive they were. Positive and negative discipline styles correlated strongly with relationship quality, whereby dyads who have a better relationship (according to the mother) feature more positive and less negative parenting behaviours. Interestingly, these two discipline styles did not correlate, suggesting that they are distinct styles of disciplining. Household chaos related to positive discipline and relationship quality, implying that a chaotic environment is more likely to emerge in households with less optimal parenting practices. There was a strong positive correlation between child negative affect and maternal reports of negative discipline style, in line with a common finding that 'distress-related' temperament co-varies with less optimal parenting (for overview, see Sanson & Rothbart, 1995).

Interestingly, surgency did not relate to either positive or negative discipline style, despite previous studies identifying a link between activity levels and maternal hostility (e.g., Buss, 1981). Correlations between effortful control and the mother-child relationship quality did not reach significance, but the bootstrapped confidence intervals suggested a potentially reliable effect, and moderate effect sizes in a small sample are still notable (Coe, 2002). Thus, mothers judge their relationship as marginally better when the child shows temperamental capacity to control impulsive behaviour, in line with previous research highlighting the importance of the mother-child bond on child self-regulation and impulsivity (Campbell, 1995; Kochanska, Philibert, & Barry, 2009; Olson, Bates, & Bayles, 1990).

Are School Engagement and Academic Self-Beliefs Related but Distinct Constructs?

The two constructs of school adjustment (academic competence and school engagement) correlated moderately, $r = .29$, $p < .05$; children with more belief in their

own academic competence are more likely to engage positively with school. Given the visits took place between November and April of Year 1, we tested the possibility that length of time since the start of the school year would relate to their reports of either engagement or beliefs about their competence; however these correlations were not significant.

Does temperament relate to children's engagement, whereas their home and family environment relate to their academic self-concept?

Correlations. Correlations with school adjustment are depicted in Table 2.3. Moderate correlations emerged between school engagement and temperament. A child who was engaged in school is likely to have low surgency scores, display more negative affect, and be rated as higher on their effortful control. No other significant correlations emerged with school engagement. Academic competence beliefs moderately correlated with the child's age, indicating that the older a child was, the more competent they felt at school. Child temperament factors were not significantly related to their competence beliefs, whereas household chaos was moderately negatively correlated with these beliefs. Correlations with both mother-child relationship quality and mother's negative discipline style approached significance, r=.20 and .21 respectively; however, as the confidence intervals did not span zero in either case, we can consider these correlations to be small but still notable (Coe, 2002). Taken together, a five-year-old child's beliefs about their own scholastic ability are associated with household chaos, negative discipline and the quality of relationship with the mother.

Steiger transformations were run to establish which pairs of correlations were significantly different from each other (Lee & Preacher, 2013; Steiger, 1980). Of the three temperament factors, child surgency and negative affect both correlated with engagement significantly higher than their academic self-concept (Z = -.292, p<.01 for

surgency, $Z = 2.27$, $p<.5$ for negative affect), whereas there was no significant difference between the size of the correlations for effortful control. Of the home and family factors we measured, only negative discipline correlated with academic self-concept significantly more than with engagement ($Z = 1.9$, $p<.05$); both relationship quality and household chaos did not correlate with either adjustment factor significantly more than the other ($p>.05$).

Table 2.3

Correlations between independent variables and two dimensions of child school adjustment

	Child school engagement	Child academic self-beliefs
Child age (months)	.18	.23* (.02, .41)
Child verbal mental age	.13	.01
Mother education level	.01	-.06
Child surgency	-.33* (-.48, -.18)	.04
Child negative affect	.30** (.08, .52)	.01
Child effortful control	.26* (.07, .46)	.11
Positive discipline	-.02	.08
Negative discipline	.04	-.21† (-.37, -.02)
Relationship quality	.18	.20† (.01, .44)
Household chaos	-.13	-.30** (-.46, -.12)

Note. Bivariate two-tailed bootstrapped Pearson correlations. *$p<.05$ **$p<.005$

†Correlations where the *p*-values are over the .05 threshold, but the confidence intervals do not cross zero.

Regression. To address independent prediction we used bootstrapped step-wise regression analysis. The control variables (child age, gender and verbal mental age, and maternal education level) were entered into Step 1, and correlates found to be marginal or stronger were included in Step 2.

Child's school engagement. Hierarchical regression analyses can be found in Table 2.4. The control variables entered in Model 1 did not predict engagement with school. Model 1 explained only a small portion of the variance, R=.25, R^2=.06. However, Model 2 (which included the child temperament factors and mother-child relationship quality) explained significantly more variance than Model 1; R=.55, R^2=.30, R^2change=.24, $F(4,76)=6.52$, $p<.005$. Within Model 2, child's age was found to be a significant predictor of school engagement (ß=.26), along with child surgency (ß=-.34). Neither effortful control, relationship quality nor negative affect uniquely predicted engagement to a significant extent.

Child's academic competence beliefs. Hierarchical regression analyses can be found in Table 2.5. Model 1 explained a modest portion of the variation in the child's competence beliefs, R=.23, R^2=.05. Model 2 accounted for significantly more variation, R=.39, R^2=.15, R^2 change = .10, $F(3,77)=2.97$, $p<.05$. In Step 1, the child's age significantly predicted how academically competent they believed they were, ß=.22, $p<.05$. None of the other correlates entered into the model uniquely predicted the child's competence beliefs ($p>.05$ in all cases). Given the moderate inter-correlations among the three variables entered into Model 2, they appear to feature together as a profile of the home (i.e., mothers who report having a good relationship with their child tend also to report low negative discipline and low household chaos). None of the variables alone uniquely predicted child's academic competence.

Table 2.4

Hierarchical Regression Analysis Predicting Temperament Factors on Child's School Engagement

Variable	B	*SE* B	β	*p*-value	Bootstrap		
					SE B	*p*-value	CI
Step 1							
Child age (months)	.06	.03	.20	.08	.03	.08	.0, .12
Gender	.18	.21	.09	.41	.21	.40	-.24, .57
Mother education level	.02	.11	.02	.86	.11	.88	-.21, .24
Child verbal mental age	.12	.01	.14	.23	.01	.21	-.01, .04
Step 2							
Child age (months)	.08	.03	**.26***	.01	**.03***	.01	02, .14
Gender	.07	.19	.04	.71	.19	.70	-.28, .46
Mother education level	-.01	.10	-.01	.93	.10	.94	-.21, .20
Child verbal mental age	.02	.01	.16	.14	.01	.15	-.01, .04
Surgency	-.38	.12	**-.34***	.00	**.12***	.00	-.60, -.13
Negative affect	.18	.11	.17	.11	.13	.20	-.08, .44
Effortful control	.23	.13	.17	.10	.13	.09	-.20, .47
Relationship quality	.52	.38	.13	.18	.38	.14	-.13, 1.51

Note. Bootstrapped to 1,000 samples with 95% bias-corrected acceleration.*$p<.05$; $p<.005$

Table 2.5

Hierarchical Regression Analysis Predicting Dyad and Context Factors on Child's Academic Competence Beliefs

					Bootstrap		
Variable	B	*SE* B	β	*p*-value	*SE* B	*p*-value	CI
Step 1							
Child age (months)	.06	.03	**.22***	.05	**.03***	.03	.00, .12
Gender	-.03	.19	-.02	.86	.19	.86	-.43, .38
Mother education level	-.03	.09	-.03	.78	.08	.73	-.18, .12
Child verbal mental age	.00	.01	.04	.74	.01	.73	-.02, .03
Step 2							
Child age (months)	.05	.03	.19	.08	.03	.07	.01, .10
Gender	-.04	.19	-.03	.82	.20	.82	-.40, .35
Mother education level	-.06	.09	-.07	.55	.08	.49	-.22, .11
Child verbal mental age	.00	.01	.02	.86	.01	.85	-.02, .03
Negative discipline	-.30	.28	-.13	.29	.27	.25	-.79, .22
Household chaos	-.29	.17	-.20	.10	.18	.10	-.65, .08
Relationship quality	.30	.39	.09	.45	.43	.46	-.44, 1.17

Note. Bootstrapped to 1,000 samples with 95% bias-corrected acceleration.*$p<.05$; $p<.005$

Discussion

For the first time, distinct dimensions of school adjustment, as reported by the child, and their correlates have been studied in the first formal year of schooling. Our results uncover a robust and previously unseen pattern – aspects of child temperament are connected to their school engagement, while family and home environment factors relate to the child's academic competence beliefs.

Despite generally positive reports from children, which was as expected (Entwisle et al., 1987; Fredricks & Eccles, 2002; Nelson et al., 2009; Perry & Weinstein, 1998; Stipek, 1981), our data revealed variance in adjustment reports in children even as young as age 5. Additionally, we found that the two dimensions of adjustment, school engagement and academic self-concept, are moderately related constructs (Bong & Skaalvik, 2003; Miserandino, 1996), but did not correlate highly enough to converge (as hypothesised by Ladd & Price, 1987). This validates our decision to consider these two aspects of school adjustment separately. Both child temperament and familial factors were found to relate to school adjustment in Year 1, though the pattern of correlations was differentiated.

Child Chronological and Mental Age

Our study found no relation between children's academic self-concept and their actual ability, as measured by verbal mental age. This shows that at age 5 and 6 children are not yet referring to formal and standardised indicators of ability to understand their own ability. Instead, they are using other factors to develop a sense of competence. It is likely that over the next academic year the children may use explicit rankings of performance and feedback from the teacher, but at this early stage they have not been exposed to these objective frames of reference. However, highly notable is the influence the child's maturation level (indexed by chronological age) had on how much they liked

school and on how academically able they believed themselves to be. Age was a unique predictor for school engagement, and before accounting for home and family life, also related to competence beliefs. However, this variable did not represent age in relation to the class; as the families were visited over a six-month period, these findings do not show that children who are old for their academic year have substantially different adjustment reports to those who are young for their school year. To explore further, we also computed an alternative measure, days between the earliest birthdate of the school year (September 1st) and the child's birthday, to assess relative age within the cohort. This alternative variable did not correlate with any of the other variables, demonstrating that the child's age in relation to classroom peers did not relate to any of the child temperament and home factors. As age measured by days after September 1st did not correlate with the adjustment measures, our data did not replicate existing findings of disadvantage due to a lack of comparative physical and cognitive maturation which accompanies being young for the year (and which have long-lasting and multiple negative effects: see, for example, Bedard & Dhuey, 2006).

School Engagement and Child Temperament

School engagement, which encapsulates enjoyment of school and involvement in the classroom, related exclusively to child temperament factors as reported by the mother. More engagement was associated with lower surgency, higher negative affect and higher effortful control (though on this last factor, the difference between these correlations did not reach significance). In particular, surgency uniquely predicted child-reported engagement in school. This finding corroborates existing research linking temperament to engagement, although most findings emphasise child effortful control as the key factor (Rimm-Kaufman et al., 2009; Valiente, Swanson, & Lemery-Chalfant, 2012; Yang & Lamb, 2014). The correlations suggest that children who demonstrate

high self-control feel more positive about the school environment, potentially because they have the capacity to manage the new demands put upon them. However, when the child's verbal mental age (a proxy of cognitive ability) is taken into account (in Step 1 of the regression model), effortful control is no longer a significant predictor, likely due to verbal mental age also explaining a portion of effortful control too (there was a moderate correlation between these two variables). Our finding that surgency uniquely predicts engagement suggests that impulsive, energetic and boisterous children may struggle with the rigid and systematic school day and thus like it less, and take longer to adjust and settle into the school routine. The child's negative affect did not uniquely predict significant variance in the engagement scores; this may be due to its moderate inter-correlation with surgency.

This finding between engagement and temperament contributes to the existing research linking school engagement with social, familial and home life factors (Estell & Perdue, 2013; Roorda, Koomen, Spilt, & Oort, 2011; Steinberg et al., 1992). None of the social features we measured (relationship quality, discipline styles, household chaos) related to children's engagement in school. There are a few possible explanations for this. First, maternal reports may not capture the child's own experience of home life. Maternal and child reports of parenting and relationship quality have been found to correlate moderately in families of children the same age as our sample (Atzaba-Poria & Pike, 2008), and the variance may explain non-significant correlations in our data. Second, the social factors we tested may not interfere with engagement at this stage in the child's schooling. Studies that found associations with home and family factors and engagement studied children in middle or high school (Estell & Perdue, 2013; Steinberg et al., 1992), and could not generalise to younger children; our findings suggest that the effect may be minimal at this age.

Academic Self-Concept and Home Life

Children's reports of their academic self-concept – their beliefs about their own competence in school – correlated with the familial and home life factors, whereby children who reported a high self-concept (controlling for verbal mental ability) tended to have a mother with less negative discipline styles, and have a better quality relationship with her. In addition, they came from homes which mothers reported as less chaotic. These correlations fit with the ideas that self-concept stems from a social, rather than personal, foundation (Bong & Skaalvik, 2003); mother-child relationship (Connell, 1991), parenting styles (Grolnick & Ryan, 1989) and structure in the home (Reschly & Christenson, 2012) all play a part in meeting the basic psychological need of a belief in one's own competence. The children arrive at school with a honed sense of self-efficacy helped, or hindered, by the atmosphere of the home life from which they come. None of these factors uniquely predicted child's competence beliefs. We anticipate that because these home and relational aspects all had moderate inter-correlations, none contributed a distinct prediction of the variance. Instead, they all converge to show a 'profile' of the child's home life of structure, discipline and relationship quality, which together foster the conditions under which positive self-beliefs might emerge.

None of the three child temperament factors were associated with child's academic competence beliefs. Nelson and colleagues (2009) found relations between competence beliefs and temperament; however cognitive competence beliefs in their study were part of the *general self-concept* construct they used in their analysis (which also included beliefs about physical competence and peer and maternal acceptance). This may explain the inconsistencies between these findings and our own – our data suggests that *academic* competence beliefs specifically do not appear to stem from the child's temperament (in terms of surgency, negative affect and effortful control).

Limitations and Future Directions

Although the findings from this study have revealed new insights, there were some limitations in the methodology. Firstly, a larger sample size would have provided more sensitivity to small effect sizes, and provided opportunities to run more complex analyses. Whilst differences in how long the child had been in school (i.e. when the visit took place during the school year) did not affect their adjustment reports, there would also be value in capturing temperament and home life characteristics measured when the child is younger, to further understand whether concurrent or early factors are more influential. Also of interest would be using teacher reports of child's actual academic competence, as well as the child's verbal mental age, in order to triangulate the child's competence beliefs using both metrics. Finally, the lack of diversity in the ethnicity of the sample, and the under-representation of less highly-educated mothers, requires us to be careful about over-generalisations of our findings; for example, race has been found to play a critical role in school disaffection for children even as young as age 7 (Mokrova, 2015). Even so, it is striking that we yielded robust effects in a small, homogenous sample; we can therefore consider these effects to be conservative in comparison to the general population.

Conclusions and Practical Implications

Improving adjustment to school is a long-term educational and psychological initiative, and identifying children who are at risk of early maladjustment is a valuable contribution to this effort. By distinguishing different aspects of adjustment, and finding distinct associated factors, our results may go some way to help identify children who may take longer to adjust to school – or even target children for intervention, given that early maladjustment can have negative consequences. Our findings suggest different leverage points for intervention. Specifically, they emphasise the value in schools'

consideration of a child's surgency (activity levels and boisterousness) in the early years, and consider alterations to the school and classroom context that would provide a better 'fit' for this temperamental profile. Related research has found that children's under-controlled behaviour responds better to particular classroom set-ups (Vitiello et al., 2012). The benefits of parenting interventions may also spill over into children's academic lives, particularly if the child struggles with a low academic self-concept. Children who have chaotic home lives, exposure to poor discipline practices and a less positive relationship with their mother would benefit from a buffer against developing negative self-beliefs associated with school even within the first school year, as educational trajectories may already be at risk from school adjustment problems.

Chapter 3:

Paper 2 - Comparing Apples and Oranges? Investigating the Ecological Validity of Extrapolating Homework Behaviour from Non-Homework Observations

Abstract

The quality of maternal help facilitates effective homework sessions; however, research into homework interactions often use, or refer to, non-homework activities. As maternal behaviour is task-bound, and homework carries distinct associations, non-homework tutored tasks may elicit different behaviour from mother and child, which in turn may relate to distinct aspects of the dyad. We aimed to test the ecological validity of using non-homework tutored tasks as a 'proxy' for homework interactions: Do mothers and children show the same rates of positive and negative affect in these two tasks? How does affect relate across the tasks? Is affect associated with the same, or different, mother, child and dyad factors?

Eighty-five mother-child dyads of 5-6 year old children (43 boys) from South-East England were visited in the home. The dyad was videotaped completing the homework the child had been given, and then completing an Etch-A-Sketch drawing task. These videos were coded for mother and child positive and negative affect. A maternal questionnaire measured her personality, attitudes to homework, parenting style, and her child's temperament.

While the two tasks yielded similar levels of positive affect across the sample, mother and child positivity was not correlated. Mothers' positive affect during homework related to her homework attitudes, perspective-taking, proneness to anger, discipline style and her child's effortful temperament; child's positive affect during homework was associated with mother's proneness to anger. The findings suggest that mother and child affective behaviour, and associated factors, in observations of genuine homework differ to those of a non-homework tutored task; thus, existing research using proxy homework tasks may not generalise to actual homework.

Introduction

The role of parental involvement in children's homework has received much attention over the years (Cooper et al., 2000; Hoover-Dempsey et al., 2001; Hyde et al., 2006; Levin et al., 1997; Patall et al., 2008). It has been established that the quality of the involvement matters more for child outcomes than the quantity (Cooper et al., 2000; Grolnick & Ryan, 1989; Patall et al., 2008; Pomerantz, Moorman, & Litwack, 2007; Pomerantz, Wang, & Ng, 2005). However, the existing literature into homework sessions between mother and child varies in what is used as a homework task. Many papers simulate genuine homework interactions by providing a 'homework-like' task, in an effort to maintain ecological validity. However, studies using genuine homework, provided by the child's teacher, have so far not been reported. In this study, we sought to investigate whether alternative tasks are a suitable proxy for genuine homework, by comparing mother and child affective behaviour during homework and during a non-homework tutored problem-solving task. We also explored whether characteristics of the mother, the child or the dyad were similarly associated with behaviour seen in both tasks.

Variation in Methods and Measures in Homework Research

Most research on homework has used interviews, surveys, questionnaires, or vignettes to gather information on the homework experience (Knollmann & Wild, 2007; Levin et al., 1997; Pomerantz et al., 2005; Solomon, Warin, & Lewis, 2002; Xu & Corno, 2003). While studies with these measures are valuable, authors agree that there is a great deal of information to be accessed through detailed and objective analysis of observational measures of homework interactions (e.g., Cooper et al., 2000; Cooper & Valentine, 2001; Pino-Pasternak, Whitebread, & Tolmie, 2010).

As homework in the early school years is often a task completed with the mother, research on homework is informed by the expansive literature on maternal tutoring and mother-child collaboration that currently exists. While non-academic mother-child tasks are appropriate to observe problem-solving behaviour, mothers and children may behave differently during these tasks to their homework tasks. Homework has specific features (it takes place at home, is set by the teacher, and reinforces classroom learning: Cooper, Robinson, & Patall, 2006; Cooper, 1989; Corno, 1996, 2000; Trautwein & Köller, 2003), and studies concerning homework vary in how closely they resemble the real homework experience. Some interaction studies cited in homework literature use tasks such as Etch-A-Sketch drawing (Stright, Neitzel, Sears, & Hoke-Sinex, 2001) or block design puzzles (Hokoda & Fincham, 1995), and have been described as analogous to homework, despite having little academic or schoolwork resemblance. Other papers investigating homework interactions use activity sheets set at the level of the child's age as a replacement for genuine homework (Else-Quest et al., 2008; Fernandes-Richards, 2006; Lindberg et al., 2008; Pino-Pasternak, 2014; Pratt, Green, MacVicar, & Bountrogianni, 1992), but this is not necessarily revision of, or building on, classroom work. Additionally, many of the studies have taken place in laboratories rather than in homes (Fernandes-Richards, 2006; Hokoda & Fincham, 1995; Pino-Pasternak, 2014). The validity of measuring parental behaviour in lab observations as an approximation of home-based behaviour has been questioned (Grolnick, Gurland, DeCourcey, & Jacob, 2002). While some studies into homework have taken place in the family home to eliminate this limitation (e.g., Else-Quest et al., 2008; Lindberg et al., 2008; Stright et al., 2001), the majority are lab-based.

The absence of genuine homework in existing studies has been commented on (e.g., Knollmann & Wild, 2007), but these proxies continue to be used, likely due to

logistical constraints with using actual homework (Cooper & Valentine, 2001). We propose that the specific conditions of homework may give rise to different affective behaviour compared to that observed in other non-homework tutored tasks.

The associations that mother and child hold about school and learning that come with homework may play a part in their affective behaviour. Murphey (1992) postulated that rather than being consistent across scenarios, parenting behaviours and practices are task- and situation-bound. Homework is part of a performance-oriented learning structure set by school, and therefore has attached to it many attitudes and beliefs the mother and child have to schoolwork, marking, and academic success, which may not feature in other dyadic interactions. Behaviour during an activity that is not provided by the school (nor indeed associated with school at all) may not be influenced by attitudes towards school, learning, the teacher, or homework in general. Given that mothers' quality of support suffers during a tutored task under 'high-pressure' conditions (Grolnick et al., 2002), similar mechanisms may be at work during homework that would not exist during non-homework interactions. Furthermore, Sawyer (2015) demonstrated how children's behaviour is substantially affected by whether a task was presented as a 'play' (pretend role-play) or 'non-play' (i.e. production-oriented, reward-based) activity. Children's behaviour is therefore influenced by associations made about the nature of the task and its outcome, so a child doing homework may not be as positive as when doing a task with no academic pressures attached.

Maternal attitudes to homework may also influence emotions during homework interactions. Attitudes to teaching and to homework in both mother and child are linked with self-reported behaviour during homework (Chen & Stevenson, 1989; Cooper, Lindsay, Nye, & Greathouse, 1998; Hoover-Dempsey et al., 2001; Katz, Kaplan, & Buzukashvily, 2011; Xu, 2007). Homework is often reported as particularly emotionally

charged, and it has the potential for tension and conflict, especially in later years (Else-Quest et al., 2008; Levin et al., 1997; Pomerantz et al., 2005). These affective responses to the pressures of homework may manifest themselves in early homework interactions, whilst non-homework tutored tasks between mother and child may be less susceptible. To date, no study has tested the validity of non-homework activities by comparing the observed affective behaviours of mother and child during genuine homework and during a problem-solving task more typical of parent-child interaction research.

Correlates of Mother-Child Interactions during Homework and Non-Homework Tasks

The second focus of our study was to investigate whether mother or child affect during homework and an additional non-homework tutoring task was associated with dyad and individual characteristics. The transactional model of child development (Sameroff & Chandler, 1975; Sameroff, 2009) is a bidirectional account of the learning experience, and acknowledges that both maternal and child characteristics and thought processes impact on each other during an interaction. On this basis, we identified some potential maternal personality factors and child temperament variables, along with some measures of dyadic quality, which may all contribute to their behaviours and responses to each other's behaviours during homework and non-homework tutored tasks.

Maternal characteristics. Extensive research on maternal personality has found strong links to the behaviour she directs towards her child (Belsky, 1984, 1990; Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009), and her affect displays are no exception. For example, mothers high on self-reports of neuroticism, disagreeableness and negative emotionality tend to display more negative affect and less warmth towards their preschool-aged child, affecting the child's own negativity (Kochanska, Clark, & Goldman, 1997). Externalising facets of neuroticism, like proneness to anger and

hostility, may be intensified during interactions with children (Belsky & Barends, 2002), especially under stressful conditions. On the other hand, mothers high in empathy deliver more sensitive support during homework than those with low empathy (Katz et al., 2011). Trautwein hypothesised that maternal attitudes to homework indirectly influence the child's homework behaviours, by shaping their self-efficacy (Trautwein, Lüdtke, Schnyder, & Niggli, 2006). Her attitudes may also impact upon her own affect (Katz et al., 2011); if a mother believes in the inherent benefit of homework, she may be more motivated to make the interaction a positive and engaging experience, and thus behave with more positive affect, alternatively, she may find the experience more stressful and show negativity. Mothers who derive gratification from helping with homework, and believe in its value, provide more homework help for their children (Levin et al., 1997); this could also extend to the affect she shows while helping. Thus, we hypothesise that the affect displayed during homework tasks may be especially influenced by maternal empathy, proneness to anger, and attitudes towards homework.

Child characteristics. A child's temperament also plays a role in their experience of school and education; their surgency, negative affect and effortful control has been associated even at ages 5-6 with their engagement in and liking of school (Leith, Pike & Yuill, in preparation). It stands to reason, then, that a child's temperament may also come into play when engaging in homework activities. In addition, child temperament is known to relate to maternal behaviour during joint tasks in many ways (Neitzel & Stright, 2004). Children with 'difficult' temperaments appear to elicit more negative parenting (Belsky, 1990), and more negative (but not less positive) affect from the mother (Gauvain & Fagot, 1995). Furthermore, children with high activity levels and low attention display more negative emotions themselves, along with their mother, on joint tasks (Webster-Stratton & Eyberg, 1982). Thus, the child's

own temperament, especially the traits that help or hinder concentration and motivation, have been shown to relate to their own negativity, and that of their mothers, in observed interactions.

Dyad characteristics. Homework interactions occur in the broader context of an existing mother-child relationship. One-off mother-child interactions are often used as a window to see the quality of their relationship and the mother's parenting style. Emotions and warmth are tied up in the parenting experience (Darling & Steinberg, 1993; Dix, 1991; Pomerantz et al., 2005), and the quality of the relationship between the pair has been associated with positive affect during interactions (Mulvaney, McCartney, Bub, & Marshall, 2006). As previously mentioned, multiple associations, attitudes and emotions come attached to the homework interaction; it is plausible that the mother-child relationship may play a substantial role in whether, and how much, positivity or negativity emerges during homework, and during tutoring tasks.

The Current Study

Our study addressed three research questions. Firstly, do mothers and children show the same rates of positive and negative affect in a genuine homework task as they do in a non-homework tutoring task? Secondly, does mother and child affect relate within each task? And thirdly, are these affective behaviours associated with the same, or with different, mother, child and dyad factors?

Method

Participants and Recruitment

Most participants were recruited via a database at the University of Sussex of mothers who had either taken part in previous studies with their child or shown interest in taking part in child development research. Mothers of children whose birthdate lay within the range of the Year 1 in the UK (5-6 years) were contacted via email and

telephone; sixty mothers were recruited for the study this way. A further ten mothers were recruited after responding to advertisements, and participating mothers also helped recruit fifteen families via word of mouth. Ethical approval for the study was granted by the University of Sussex's research ethics committee.

Eighty-five children (43 boys) and their mothers took part in the study. The children's mean age was 73 months (*SD* = 3.23), ranging between 65-80 months. Fifty children (59%) had one sibling, twenty (23%) had two or more, and fifteen (18%) had none. Of those with siblings, half were the youngest of the family (n=35), and twenty-nine (41%) were the eldest, whilst six (9%) were middle children. Mothers came from a relatively middle-class socio-economic background, with forty-two (50%) having an undergraduate degree and a further twenty-five with postgraduate qualifications. Seventeen (20%) of the mothers' highest qualifications were GCSEs or A-Levels.

Procedure

Mothers and children were visited in the family home on a day when the child had homework to do. The first three activities were joint mother-child tasks, which were videotaped; the tasks included in the present study were the first and third task (a task involving mother and child talking about photographs on an iPad took place between the two tasks). The researcher left the room during each activity, and came back in when the child said they had finished.

Homework. The mother and child were asked to start or continue with any homework that the class teacher had set the child, just as they normally would, and the mother was instructed to help her child as she typically would during homework. They were told there was no time-limit; instead, they could complete the task if they wished or get as much of it done as they usually would. The homework task ranged from

reading a schoolbook to doing sums and spellings, along with the occasional model-building: typical homework practices in the first school year in the UK.

Etch-A-Sketch. An Etch-A-Sketch task was used as a non-homework tutoring task for this study. Variations of this task have been used in previous studies to measure mother and child affect (Deater-Deckard & Petrill, 2004; Pike et al., 2006), and it is difficult for young children to complete without parental support (Stright et al., 2001). The child was given an Etch-A-Sketch, a mechanical drawing toy, and the researcher demonstrated the basic mechanisms of the two dials. The researcher then gave the child a laminated A4 (21x30cm) sheet with a diagram of a square with two diagonal lines between the opposite corners (Appendix I) and asked the child to draw the shape on the Etch-A-Sketch. The researcher explained to the child that the mother was there to help if needed. Almost all of the children had never used an Etch-A-Sketch, whereas most of the mothers were familiar with the toy.

Following the mother-child activities, the child was administered the British Picture Vocabulary Scale 3 (BPVS 3: Dunn, Dunn & Styles, 2009), while the mother completed a questionnaire.

Measures

Child factors. *Verbal IQ:* The BPVS 3 measures receptive vocabulary, and was used as a proxy for verbal mental age. The average for the population is 100; the mean of the children in this study was 107 (*SD* = 8.74). *Child temperament:* Mothers completed the Child Behavior Questionnaire, Very Short Form (Putnam & Rothbart, 2006), a scale consisting of 36 items which load onto three temperament factors of surgency (impulsivity, activity level, low shyness, high-intensity pleasure), negative affect (anger, discomfort, low soothability, sadness, fear) and effortful control (inhibitory control, attention focusing, perceptual sensitivity, low-intensity pleasure).

The short form has been found to have good internal consistency and longitudinal stability in young children (Putnam & Rothbart, 2006). Items consisted of statements (e.g., 'Is quite upset by a little cut or bruise'), which the mother scored on a 7-point Likert scale (1 = extremely untrue, 7 = extremely true) according to how much the statement represented her child. This scale can be found in Appendix F. The subscales reached adequate reliability, with alphas of .77, .77 and .74 respectively.

Mother factors. *Maternal perspective-taking:* mothers completed the 'perspective-taking' subscale from Davis' (1983) Interpersonal Reactivity Index (Appendix J). The subscale consisted of seven statements, rated on a 5-point Likert scale on how well they describe her, ranging from 1 ('does not describe me well') to 5 ('describes me very well'). Reliability for the perspective-taking subscale was adequate, α = .77. *Maternal proneness to anger:* Mothers completed the 5-item emotional anger subscale (α = .67) of the Emotionality, Activity, Sociability and Impulsivity (EASI) temperament survey (Buss & Plomin, 1984 – see Appendix K), whereby she rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) how much she agreed with each statement (e.g., 'I am known as hot-blooded and quick-tempered'). This scale had sufficient reliability, α=.82. *Attitudes towards homework:* We used Cooper et al.'s (1998) questionnaire on beliefs and attitudes towards homework (see Appendix L). Five items ask the mother about whether she feels positive about homework in general and whether she thinks it is helpful or unhelpful for different skills. Mothers rated the items on a 5-point Likert scale from not positive (1) to positive (5). In order to establish any difference between general attitudes and attitudes for her child's homework specifically, we added a new item after each original one, rephrasing the question so it is about her child. For example, we used the item 'Do you think homework helps students learn?' and added a new item 'Do you think homework helps *your child in particular* learn?'.

Reliability for all ten items was strong, α=.92. *Parenting and parent-child relationship:* The Parenting Scale, taken from the Parent and Family Adjustment Scale (PAFAS: Sanders et al., 2013), measures level of dysfunction in parenting practices (17 items) and in the parent-child relationship (11 items) (see Appendix G). Mothers rated the degree of truth of statements such as 'I argue with him/her about their behaviour or attitude' on a 4-point Likert scale, ranging from 1 ('Not at all') to 4 ('Very much'). Reliability of these two scales was found to be inadequate, and so factorial analyses were conducted to create suitable constructs for these scales. The parenting practices subscale yielded two separate factors, which the authors of this study agreed reflected constructs of positive discipline (seven items, e.g., 'I send him/her to time out (e.g., sit alone in a quiet place) when he/she misbehaves') and negative discipline (six items, e.g., 'I give in and do a task myself if he/she does not do what I ask'). The positive discipline factor showed sufficient reliability, α=.71, and while the reliability of the negative discipline factor was low (α=.56), it had face validity, and did not correlate highly with the other discipline factor (at r= -.16, p>.05) and so it was included in subsequent analyses, but caution with interpretation is warranted. The 11-item parent-child relationship subscale was analysed similarly, as it also showed low internal reliability (α=.58), and yielded one factor of nine items (e.g., 'I enjoy spending time with him/her'), with a more acceptable reliability of α=.70. These nine items showed construct validity, and thus, the two items with the lowest loading were removed from the 'relationship quality' factor.

Observed Measures: Mother and Child Positive and Negative Affect

Homework. The researcher and an independent coder trained together to code the videos for tallies of expression of positive and negative affect for the first five minutes of the homework activity. Five minutes was decided because a) almost all

interactions lasted between five and ten minutes, and b) initial coding demonstrated the full range of affect within the first few minutes, so it was enough time for natural behaviours to emerge. For any time spent away from the homework (the child goes to the bathroom, the mother looks for a pen) the coding was paused, and the time length paused was added to the end of the five-minute segment. At the end of coding, the coders rated the mother and child affect based on global codes adapted from the PARCHISY coding scheme (Deater-Deckard et al., 1997). A five-point Likert scale, with 1 indicating 'no affect displayed' and 5 indicating 'constant and intense demonstrations of affect' was used to code positive affect (with behaviours such as smiling, laughing, affection, positive vocal tone, humour) and negative affect (e.g., frowning, complaining, anger, negative tone) by both mother and child (these two schemes are contained in Appendix M).

Five videos were excluded from coding due to technical problems or the mother and child moving out of view for over thirty seconds. Of the other eighty videos, fourteen (17.5%) lasted under five minutes (usually due to the child finishing reading), but only three lasted under three minutes, and as the coding for affect was based on extent as much as frequency, these shorter videos were included as their brevity was unlikely to affect the scoring.

Inter-rater reliability on ten randomly selected videos, computed using a two-way mixed, absolute agreement, single-measures intra-class correlation, was an acceptable .79 (Cicchetti, 1994), indicating that the homework videos were rated similarly by both coders. Sixty of the remaining videos were coded by one coder and ten by the other. The coding process was moderated by the second coder after every ten videos, and the videos that were judged by either coder as difficult to code were watched and coded together following discussion.

Etch-A-Sketch. Child and mother positive and negative affect was coded similarly for the Etch-A-Sketch task. Two coders (one of whom was the criterion coder from the homework coding) rated the extent of affect using the same adapted PARCHISY scales as in the homework task. The two observers watched five minutes of the mothers and children taking part in the Etch-A-Sketch task, and then provided independent, and agreed, overall global scores from 1 to 5 for mother and child positive and negative affect; the agreed codes were used for subsequent analysis. For child positivity and negativity, reliability of the independent codes reached an ICC of .86 and .94; mother positivity reached .76.

One interaction could not be coded due to technical problems. Twenty-three (27%) of the dyads finished the task before five minutes; ten finished within three minutes, and only one finished within two, and all of these were included in analysis.

Results

Preliminary Analyses

Means and standard deviations can be found in Table 3.1. Maternal negative affect did not yield sufficient variance (only three mothers reached a score of 2 during homework, and five different mothers scored 2 in the Etch-A-Sketch task), and was therefore dropped from the analysis. Overall, the mother's positivity was relatively high for both tasks, as was the child's, with means of between 2.5 and 3 on a scale of 1 to 5. Children showed more negativity than mothers in both tasks too. Bootstrapped zero-order correlations were run on the affect scores (see Table 3.2). Within a dyad, the mother and the child often appear to express similar rates of positivity, regardless of whether the task was the Etch-A-Sketch or their genuine homework. Children's negativity also appears to have little relation to how much positivity the mother shows

throughout the task. Only within the non-homework tutored task did children's positive affect correspond with less negative affect.

Table 3.1

Descriptive statistics of video observations and family characteristics

	Mean (*SD*)	Range
Observation scores		
Mother positive affect		
Homework	2.90 (1.02)	1-5
Etch-A-Sketch	2.81 (1.13)	1-5
Mother negative affect		
Homework	1.04 (.19)	1-2
Etch-A-Sketch	1.06 (.24)	1-2
Child positive affect		
Homework	2.70 (1.17)	1-5
Etch-A-Sketch	2.62 (1.15)	1-5
Child negative affect		
Homework	1.48 (.62)	1-4
Etch-A-Sketch	1.87 (1.18)	1-5
Family variables		
Child characteristics		
Age (months)	72.70 (*3.23*)	65-80
Verbal IQ	106.6 (8.74)	81-129
Surgency	4.31 (.89)	2-5.67
Negative affect	4.13 (.94)	2-6.92
Effortful control	5.43 (.74)	3.67-6.43
Mother characteristics		
Perspective-taking	3.84 (.59)	2-5
Emotional anger	2.59 (.82)	1.20-4.60
Attitudes to homework	2.90 (.82)	0.3-4
Dyad variables		
Positive discipline	3.17 (.49)	1.57-4.00
Negative discipline	1.73 (.36)	1-3.33
Relationship quality	3.74 (.26)	2.67-4

Table 3.2

Correlations between mother and child affect in homework and non-homework task

Variable	1	2	3	4	5	6
Homework						
1. Mother positive affect	-					
2. Child positive affect	.48**	-				
3. Child negative affect	.03	.05	-			
Etch-a-Sketch						
4. Mother positive affect	.15	.13	.17	-		
5. Child positive affect	.08	.23*	-.01	.57**	-	
6. Child negative affect	-.00	-.21 (-.41, .04)	-.09	-.12	-.41**	-

Note. Bivariate two-tailed Pearson correlations, bootstrapped with 1,000 samples and bias-corrected accelerated confidence intervals. *p<.05 **p<.005

Zero-order correlations were run on all study measures (see Table 3.3). The mother and child affect scores in both tasks were correlated with child's sex, age in months and verbal mental age. None of these potential confounding variables approached significance with the affect ratings, $p>.05$.

Research Question 1: Do mothers and children show the same rates of positive and negative affect in a genuine homework task as they do in a non-homework tutored task?

Due to the similar means in each measure of affect across tasks, paired-samples T-tests were run to statistically compare the scores. While the differences between child negative affect scores were small, they were significantly higher in the Etch-A-Sketch task than during homework, $t(78)=2.53$, $p<.05$. The positive affect scores did not significantly differ between the two tasks, $t(78)=.32$, $p=.75$ for mother positive affect, and $t(78)=-.47$, $p=.64$ for child positive affect.

Research Question 2: How do mother and child affect relate across the two tasks?

To address this research question, correlations were bootstrapped to 1,000 samples, with 95% bias-corrected acceleration, to accommodate for the lack of normal distribution in some of the affect measures (Mooney & Duval, 1993).

The only affect code shown to correlate across tasks was child positive affect, $r=.23$ (see Table 3.2); children who displayed positive affect during the homework task also tended to be positive in the Etch-A-Sketch task. It is interesting to note that the positivity of the mothers was not consistent across tasks.

While child positivity and mother positivity related to each other within tasks, they did not relate across tasks. Correlations between the child's positive and negative affect during one task and the mother's positive affect during the other did not reach significance. Taken altogether, these results show that while the tasks were

Table 3.3

Zero-order correlations between measures of child, mother, and dyad characteristics

	1	2	3	4	5	6	7	8	9	10	11
Child variables											
1. Age (months)	-										
2. Gender	.02 (-.19, .25)	-									
3. Verbal IQ	-.07 (-.25, .11)	.01 (-.23, .23)	-								
4. Surgency	.14 (-.08, .33)	-.03 (-.23, .16)	.20 (.02, .38)	-							
5. Negative affect	-.03 (-.31, .09)	.13 (-.11, .35)	.01 (-.21, .23)	**-.32** (-.51, -.12)**	-						
6. Effortful control	-.10 (-.31, .06)	.08 (-.16, .30)	**.26* (.06, .45)**	-.07 (-.30, .13)	.13 (-.10, .33)	-					
Mother variables											
7. Perspective-taking	**-.25* (-.43, -.05)**	.12 (-.94, .32)	.08 (-.19, .34)	-.18 (-.39, .07)	.01 (-.25, .28)	.16 (-.02, .37)	-				
8. Emotional anger	.11 (-.09, .31)	-.03 (.23, .17)	.01 (-.22, .18)	.01 (-.21, .23)	.10 (-.12, .33)	-.12 (-.34, .10)	**-.42** (-.59, -.19)**	-			
9. Attitude to homework	.03 (-.22, .30)	.14 (-.05, .33)	**.22* (-.39, -.02)**	-.19 (-.31, .08)	.05 (-.21, .28)	-.03 (-.20, .16)	.17 (-.05, .41)	-.03 (-.28, .21)	-		
Dyad variables											
10. Positive discipline	-.12 (-.38, .16)	.12 (-.10, .35)	-.18 (-.36, .00)	-.12 (-.32, .09)	.18 (-.05, .41)	-.12 (-.33, .10)	**.23* (.03, .43)**	-.07 (-.28, .16)	.03 (-.20, .27)	-	
11. Negative discipline	-.01 (-.25, .29)	-.14 (-.32, .09)	.03 (-.13, .19)	-.11 (-.32, .14)	**.35** (.12, .51)**	-.19 (-.39,-.00)	-.19 (-.40, .05)	**.28** (.05, .47)**	-.09 (-.38, .22)	-.14 (-.39, .11)	-
12. Relationship quality	.02 (-.18, .25)	.05 (-.17, .28)	.05 (-.08, .19)	.03 (-.13, .20)	.05 (-.14, .24)	.20 (.03, .39)	**.35** (.21, .50)**	**-.30** (-.48, .11)**	.01 (-.23, .26)	**.42** (.17, .61)**	**-.34** (-.52, -.11)**

Note. Bivariate two-tailed listwise Pearson correlations, bootstrapped with 1,000 samples and bias-corrected accelerated confidence intervals. **p*<.05 ***p*<.005.

Table 3.4

Partial correlations between mother and child affect in both tasks and hypothesised associated factors

	Homework			Etch-A-Sketch		
	Mother pos. affect	Child pos. affect	Child neg. affect	Mother pos. affect	Child pos. affect	Child neg. affect
Child variables						
Surgency	.03 (-.21, .26)	-.07 (-.31, .16)	.05 (-.29, .37)	.00 (-.22, .20)	-.09 (-.31, .12)	.03 (-.21, .26)
Negative affect	-.05 (-.26, .16)	.01 (-.19, .21)	-.04 (-.25, .17)	.06 (-.26, .16)	.17 (-.07, .40)	.07 (-.16, .27)
Effortful control	**.23* (.03, .39)**	.14 (-.07, .32)	-.05 (-.26, .14)	-.07 (-.17, .21)	-.09 (-.31, .15)	-.02 (-.25, .21)
Mother variables						
Perspective-taking	**.26* (.06, .44)**	.18 (-.03, .38)	-.15 (-.42, .17)	.09 (-.15, .31)	-.15 (-.37, .06)	-.04 (-.27, .21)
Emotional anger	**-.18, *p*=.11 (-.35, -.01)**	**-.31** (-.48, -.13)**	.02 (-.26, .26)	-.14 (-.40, .16)	.16 (-.08, .39)	-.10 (-.29, .10)
Homework attitudes	**.23* (.01, .43)**	.21 (-.03, .41)	-.01 (-.31, .21)	.01 (-.22, .27)	-.09 (-.33, .12)	-.01 (-.20, .22)
Dyad variables						
Positive discipline	-.03 (-.33, .29)	-.08 (-.35, .21)	-.05 (-.23, .15)	.08 (.12, .29)	.13 (-.10, .34)	-.20, *p*=.07 (-.41, .05)
Negative discipline	**-.24* (-.42, -.07)**	-.13 (.35, .12)	.05 (-.18, .29)	-.01 (-.26, .28)	-.07 (-.26, .15)	.01 (-.27, .26)
Relationship quality	**.23* (.02, .41)**	.05 (-.19, .26)	.04 (-.13, .25)	.03 (-.27, .29)	.04 (-.21, .25)	-.18 (-.46, .06)

Note. Two-tailed listwise correlations (controlling for child's age, gender and verbal IQ), bootstrapped with 1,000 samples and bias-corrected accelerated confidence intervals. *p<.05 **p<.005.

well-matched in terms of eliciting positivity, this affect was not consistent across the tasks for individual families.

Research Question 3: Are the affective behaviours associated with the same, or with different, mother, child and dyad factors?

In order to address this research question, bootstrapped correlations were calculated between the individual and dyadic factors and the affect scores (see Table 3.4). These correlations controlled for age, verbal mental age and gender of the child. Overall, effect sizes were small, and in the cases of trends towards significance, bootstrapped confidence intervals informed us about which of these small effects within the homework task were less likely to be a Type II error. The affect observed during the *Etch-A-Sketch* interactions related to very few of our hypothesised factors. Child temperament was not related to the mother's positivity or the child's positive and negative affect during the task. Of the dyad characteristics, positive discipline was found to approach a significant positive correlation with mother's positive affect, but the confidence intervals confirmed that this was unlikely to be a robust effect. The affect from the mother and child during the *homework* interaction, on the other hand, correlated with many more of the potential associated factors. Mother's positive affect was associated with aspects of herself, the child and the dyad: the child's effortful control, her own perspective-taking skills, her positive attitudes towards homework, her negative disciplining style, and the quality of her relationship with the child. All these correlations approached significance in the expected direction, and had confidence intervals which confirmed the robustness of the effect. On the other hand, child's positive affect during homework related only to mother's emotional anger, whereby mothers who self-reported more proneness to anger had children who displayed less positive affect during homework.

Discussion

This study is the first to investigate the validity of non-homework tasks to inform homework research. By comparing the affective behaviours of the mother and the child during these two tasks, we shed light on the comparability of the experience for the dyad. Additionally, we examined whether the affect they display during homework is associated with the same, or with different, individual and dyadic characteristics as during a non-homework tutored task. The analysis revealed four key findings: the homework and non-homework task yielded similar levels of positive affect across the sample; mothers' positive affect was not consistent across the two tasks whereas the children's was; mothers' positive affect during the homework task was related to multiple factors about her and her child; the child's positive affect during homework was associated with mother's proneness to anger. Surprisingly, no factors significantly correlated with affect displayed during the non-homework tutoring task.

Mothers showed very little negative affect in either task. As homework has been associated with negative, tense interactions between mothers and older children (e.g., Solomon et al., 2002), we anticipated that maternal negativity would also be observed at this young age. Previous research, however, has established that mothers rarely show negativity during observed interactions (Pino-Pasternak & Whitebread, 2010), and that it is their positivity rather than their negativity which has more predictive value in interactions of this sort (Kenney-Benson & Pomerantz, 2005; Pomerantz, Ng, & Wang, 2006). Similarly, our findings emphasise the importance of the absence of positivity over the presence of negativity. Mothers may be able to manage their own mood in light of their children's frustrations during homework in Year 1, which may be why we observe variation in negativity from the child, but not from the mother.

Mean scores indicate that both mothers and children showed no more positive affect during the Etch-A-Sketch task than during their homework. If the Etch-A-Sketch yielded substantially more positive affect than the homework, we would then have been comparing positive affect during a 'fun' activity to one what was not so fun. This finding suggests that our coding scheme was capturing context-specific, rather than general, affective behaviour from the mother. As such, we interpret the equivalences of the mean affect scores across tasks as an indicator that the two tasks are matched in terms of eliciting emotion, which supports the use of the Etch-A-Sketch task as a homework proxy for this study. The Etch-A-Sketch task elicited some negative behaviours from the child – indeed, slightly but statistically more than during homework – showing that even when children at this age do a 'fun' tutored task, they are not immune to negative feelings (see Pike et al., 2006).

Turning to our second research question, children who were positive in one task tended to also be positive in the other. This may be because the child is generally positive during tasks (or overall); alternatively, if children had had a positive experience during homework, then this may have spilled over into the next activities. Contrary to some expectations, mothers and children are not consistent in their displays of emotion across the tasks. Mothers who are positive during homework are not necessarily as positive during the non-homework tutored task, and the same with children. Given that the same coding scheme was used for both videos, and double-coded by the same researcher, it would appear that the scheme was not inadvertently measuring general expression of emotion, but the task-specific particular affective behaviour. From this, we propose that findings from proxy homework tasks may not be generalisable to genuine homework interactions.

We also aimed to shed light on the factors behind the different affective behaviours during these tasks. The mother's and child's affect during the Etch-A-Sketch task was not associated with any of the mother and child factors. This was an unexpected finding, considering the extensive literature showing these links. It may be that in interactions with children in this age group, these factors do not come into play. The extensive literature on mother-child interactions tends to concentrate on children younger than our sample. Consequently, research into traits and mother-child attachment on interaction style, many of which have been cited above, investigate interactions with toddlers (e.g., Gauvain & Fagot, 1995; and Kochanska et al., 1997) and preschoolers (Neitzel & Stright, 2004; Webster-Stratton & Eyberg, 1982). While we included the factors that had both theoretical and empirical backing, the list of measures was by no means exhaustive. The factors we identified for examination in this study may have less of an influence for the age we were studying than for younger children, and other factors may be more pertinent.

Maternal positivity during homework, on the other hand, was associated with multiple personal and social factors. If the mother rated the child as high on effortful control, which involves inhibitory control and attention focusing, she showed more positive affect during the homework task. This may be because the self-regulatory skills associated with this temperamental profile are important for homework (Bembenutty, 2011; Ramdass & Zimmerman, 2011); if a child typically uses these self-management and attentional skills, our coding scheme may be picking up on maternal praise and positive affect as reinforcement and feedback of this behaviour. The children's temperament did not relate to their *own* affect, despite findings from our own research associating temperament at this age with other feelings around school (Leith, Pike & Yuill, in preparation). Children of this young age may not see homework as a bridge

between home and school in the way that adults might, and the impact their temperament has towards their enjoyment in school may not extend to homework also.

The mother's positive attitudes towards homework also related to more positive affect during the homework interactions. Our results may be showing that mothers who believe that homework is valuable find the experience more rewarding (Katz et al., 2011; Levin et al., 1997), and thus express more pleasure; it may also be that mothers who tend to be more praising, reinforcing and encouraging during homework see the benefits of the interaction more than those who are neutral and emotionally flat. In addition, mother's self-reported personality comes into play; her perspective-taking was also associated with her positivity during homework. Discipline style, along with parent-child relationship quality, also related to the mother's positive affect during homework. Mothers who reported negative discipline, and who had lower quality relationships with their children, showed fewer positive emotions. Taken together, it would appear that maternal characteristics synonymous with more optimal parenting (perspective-taking, less anger, less inconsistent discipline) display more positive affect when working on homework.

Children's negativity during both tasks was almost entirely independent of the maternal and child factors; their positivity during homework related to maternal proneness to anger, but no other variables. A wealth of research shows that homework can bring about tension and conflict in middle school years and adolescence; this finding suggests that in the first years of school, children show less positive affect during homework if their mother is prone to angry outbursts. It is interesting to note that in this case the mother's emotional volatility appears not to dampen her child's positivity in every interaction. The pressures associated with homework may bring about more uncertainty in the child about how the mother will act, which manifests

itself in fewer displays of ease and pleasure. It is notable that it is primarily the mother's behaviour during homework, rather than the child's, that is susceptible to personal and social factors. Most of the research on negativity towards homework concentrates on the adolescent school years. Negative feelings in both mother and child during homework may emerge later; and at an earlier age, the mother's positivity may be a protective factor against these feelings developing or being expressed. Indeed, in Pomerantz' study (Pomerantz et al., 2005), mother's positivity buffered the negativity experienced during homework; this may be what we are witnessing in the current study.

Taken together, these results show that mother, child and dyad characteristics play a role in emotion expression during homework (particularly for the mother). Five-year-olds and their mothers already have a history of tutored problem-solving interactions, whereas homework is introduced once the children are in the education system. It seems that this new demand, brought from school and perhaps laden with attitudes and associations relating to the classroom, the teacher, learning and performance, is susceptible in the early years to many individual and dyadic influences, especially for the mother's affect.

Limitations and Future Directions

It is worth noting that the videotaped homework activities differed in style from home to home. While most of the activities involved reading a book, there were some writing and spelling tests too, and so the subject matter and the difficulty varied for every interaction. This is a limitation of ecologically valid research capturing naturalistic observations – it is no wonder that homework research using the child's actual homework is so scarce. As we could not statistically control for these variations, it is striking that we found statistically significant associations. Furthermore, links

between task difficulty and effort is neither clear nor consistent (Eccles, 1983); thus the families in this study may not have been affected by difficulty.

The cross-sectional design of this study means we cannot shed light on the stability of the self-reported factors, nor how typical the dyads' interactions were. Even so, inferences about mother-child behaviour drawn from one single interaction can be problematic (Murphey, 1992), and having two interactions has given us an opportunity to see the effect of different 'conditions'. Future research would benefit from following families' homework over multiple time-points within the first few years of school. Additionally, a larger sample size would allow for detection of smaller effects, and examination of more complex effects.

By studying children in the early school years, we can learn about habits as they are forming, and emerging attitudes and behaviours. There is scope to compare how child and mother positivity and negativity during genuine homework changes, and becomes more influenced by different external factors, as the child moves through the school.

Concluding Remarks

The findings from existing research that relies on proxy homework tasks may not generalise to genuine homework. Our study has shown that behaviours, and associated factors, between observations of genuine homework differ to those of a non-homework tutored task. Mother-child homework interactions play a critical role in children's academic outcomes, and need further investigation; the findings of our study suggest that existing studies into homework should be interpreted with this in mind, and that future research would be well-advised to use genuine homework whenever possible.

Chapter 4:

Paper 3 – Do Maternal Beliefs Predict Scaffolding Quality during Young Children's Homework? A Longitudinal Observation Study

Abstract

The quality of the support mothers provide during young children's homework sessions is a crucial factor for the effectiveness of homework, yet has been under-explored. Maternal beliefs are known to affect her behaviour towards her child, and this may extend to homework interactions. We sought to investigate whether maternal beliefs (attributions to school success, attitudes to homework, and expectations for child's education) when the child is in Year 1 predict the quality of maternal scaffolding during homework in Year 2. Eighty mother-child dyads from South-East England were visited in the home twice, a year apart, where they took part in filmed interactions, and the mother completed a questionnaire. Maternal scaffolding was coded from interactions at both time-points. Mothers who under-supported in a non-homework task at Time 1 (when the children were 5-6 years old) were less likely to provide optimal scaffolding during homework at Time 2. This continuity was not found for mothers who had been over-supportive at Time 1. Maternal scaffolding quality (particularly instruction quality) during homework was related to her prior belief in the importance of the home environment for children's school success, and marginally to her expectations for her child's education, but not her attitudes towards homework. We conclude that maternal beliefs play a small but significant role in her homework help, which may have long-lasting positive implications for the child's education.

Introduction

The importance of parental involvement in their children's education cannot be underestimated (Fan & Chen, 2001). However, when it comes to homework, the benefits of maternal involvement are not always clear-cut (Patall et al., 2008; Pomerantz et al., 2007; Sharp et al., 2001). Conflicting evidence has led many researchers to conclude that the *quality* of the help, rather than the quantity, has a positive impact for children's education overall, through multiple indirect pathways (Cooper, Lindsay, & Nye, 2000; Grolnick & Ryan, 1989; Hoover-Dempsey & Sandler, 1995; Pomerantz, Wang, & Ng, 2005). Parents are most involved during the early school years (Epstein, 1992), as completing homework independently is beyond the capacity of a child in the first few years of school. Thus, if the quality of help mothers provide during homework in these key years is low, this may have powerful and long-lasting negative effects for the child, potentially exacerbating a cycle of avoidance and disengagement (Corno, 1996). Understanding the mechanisms at play within a mother's provision of effective support during homework is important. In this study we investigated whether the beliefs and attitudes the mother holds about learning, homework and education affect her later scaffolding during homework.

Theoretical Framework: Scaffolding

Maternal scaffolding is a common framework for understanding cognitive support during tutored tasks. A metaphor devised by Wood and colleagues (Wood et al., 1976), scaffolding describes two supportive mechanisms of the mother in a mother-child learning activity: adding more structure and support when the child is struggling, and providing less support as the child progresses. Operationally, scaffolding is defined as a combination of behaviours, which typically covers emotional support, the quality of

the instruction she provides, how much she encourages the child to work independently when the child is capable, and how she stays involved without becoming intrusive. Ineffective scaffolding may be characterised by giving instructions that either do not help the child or give the answer too early, and either under-involvement when the child needs help or intrusiveness when the child is progressing (see Carr & Pike, 2012).

Scaffolding quality from mothers during tutored problem-solving tasks has important consequences, having been associated with the child's academic achievement more generally (e.g., Mulvaney, McCartney, Bub, & Marshall, 2006) and specifically with their self-regulation skills (Neitzel & Stright, 2003; Stright et al., 2001) and motivation (Pino-Pasternak, 2014), both of which are crucial for future success in their own independent homework behaviour (Bembenutty, 2011; Knollmann & Wild, 2007; Ramdass & Zimmerman, 2011). However, mothers vary in the quality of their scaffolding during tutored tasks (e.g., Mulvaney et al., 2006; Neitzel & Stright, 2003), which includes homework interactions (Hyde et al., 2006; Pratt et al., 1992). Therefore, it is important to identify correlates of these variations during homework.

Homework Support: Beliefs to Behaviours

A mother's beliefs and values about education are communicated to her children in direct and indirect ways, one path of which may be through her behaviour to and around her child (Scott-Jones, 1995). A wealth of empirical work shows that a mother's beliefs affect her behaviour in many different ways (Murphey, 1992), and thus the ways in which parents behave during interactions with their child may be moderated by their beliefs. Maternal behaviour appears to have numerous effects on the child (see Darling & Steinberg, 1993); and specifically her educational beliefs and values have been found to predict educational characteristics of the child, including immediate and proximal academic outcomes, self-concept and self-expectations (Davis-Kean, 2005; Eccles,

Adler, & Kaczala, 1982; Entwisle & Baker, 1983; Hoover-Dempsey & Sandler, 1995; Marshall & Jackman, 2015). The link between beliefs and behaviour is therefore especially relevant to homework interactions. Homework is an emotionally charged experience (Hughes & Greenhough, 2008; Pomerantz et al., 2005; Solomon et al., 2002), and parents vary in their thoughts, feelings and beliefs around homework (Cooper et al., 1998; Levin et al., 1997). Scott-Jones (1995) included homework monitoring as a potential mother-child interaction where belief systems about education may be communicated. On this basis, we expect that particular educationally-relevant beliefs held by mothers may explain variation in their behaviour during homework.

Homework attitudes. Not all mothers feel that homework is beneficial (Bembenutty, 2011). The children of mothers with positive attitudes towards homework tend to have positive attitudes themselves (Cooper et al., 1998), which are also associated with the child's homework behaviour. Cooper's study did not examine whether the correlation between mother and child attitudes was mediated by the quality of her support during homework interactions; however, this seems plausible.

Attributions to school success. Mothers also vary in their beliefs about what is important for a child's learning experience. These beliefs have been associated with positive child outcomes, such as improved motivation (Dweck, 1986; Mueller & Dweck, 1998); as Scott-Jones summarises, "parents' emphasising the importance of effort and downplaying the role of ability appears to promote children's achievement" (1995: p.82). Though the mechanism through which this process takes place is unclear, one route may be through homework behaviour. One study (Hyde et al., 2006) reported that of the mothers they surveyed, most believed that innate intelligence is more important for children's academic success than the home environment; and also, that most did not value homework. Taken together, mothers who consider the role of the home as

relatively unimportant may also not feel a need to deliver the best instructional support during schoolwork completed in the home. This is consistent with Hoover-Dempsey's account of homework involvement (Hoover-Dempsey & Sandler, 1995), whereby a mother's beliefs about her role in her child's education influences her instructional style, and thus affects the child's scholastic outcomes. As homework is such a divisive topic (Solomon et al., 2002; Voorhis, 2004), mothers' particular beliefs about learning may play a part in how she addresses tutoring and challenges during a homework session.

Expectations for child's education. Finally, the mother's educational expectations for her child may also influence the quality of her scaffolding during homework. Mothers' expectations are often informed and accurate, correlating with the child's actual ability (Entwisle & Baker, 1983), but this is not always the case; some over- or under-estimate the child's abilities (Eccles et al., 1982). The power of expectations appears to be strong in the education context, having long been established as a predictor of children's attainment, sometimes over and above their actual ability (Davis-Kean, 2005; Hess, Holloway, Dickson, & Price, 1984; Seginer, 1983). This phenomenon is in line with the beliefs-behaviours association (Murphey, 1992), as maternal expectations of the child's education have been associated with differences in a mother's behaviour towards her child (Davis-Kean, 2005), including how involved she gets in school activities such as homework (Keith et al., 1998) and her achievement-related behaviours at home (Halle, Kurtz-Costes, & Mahoney, 1997). Moreover, maternal expectations for attainment have been shown to relate to other aspects of the child beyond their later attainment. These expectations are often correlated with children's own expectations for themselves (Eccles, 1983; Entwisle & Baker, 1983), attitudes to school (Marjoribanks, 1987) and academic self-concept, which has been found to mediate the relationship between maternal expectations and child achievement

(Neuenschwander, Vida, Garrett, & Eccles, 2007). Expectations are thus understood to transmit from parent to child, through manifestations of expectations in many maternal behaviours (Eccles, 1983). Thus, there is substantial reason to anticipate that maternal expectations for her child's success through the education system may affect the quality of the support she provides during homework.

Overall, there is sufficient existing evidence that maternal beliefs affect behaviour to lead us to hypothesise that this may happen within the homework context.

Current Study

Our study is the first to examine whether maternal beliefs are associated with her later scaffolding behaviour during homework. We focused on the first two years of school, when homework is still a relatively novel interaction context between the mother and the child. We intended to uncover early predictors of the homework experience, which may have immediate or later consequences for children's own academic future.

Maternal scaffolding is typically observed during non-homework tasks (c.f. Hyde, Else-Quest, Alibali, Knuth, & Romberg, 2006; Pratt, Green, MacVicar, & Bountrogianni, 1992). Two questions arise: do mothers scaffold differently during homework to other tutored tasks she does with her child; and, if so, how can we distinguish her scaffolding quality during homework from her general scaffolding style? Mothers are not always consistent in their teaching strategies across tasks (e.g., Johnson & Martin, 1985) and under different conditions (e.g., Grolnick et al., 2002), and these changes in behaviour may be attributed to specific beliefs and attitudes the mother holds (Murphey, 1992). Our own research (Leith, Yuill & Pike, in preparation) found differences in the amount of positive affect displayed by mother and child during homework compared to a tutored task provided by the researcher. Evidently, the

associations with and conditions of homework relate to the supporting style of the mother. Situation-specific behaviour influenced by maternal beliefs may have long-term effects for that child in that particular situation (Murphey, 1992); thus, less optimal homework interactions may give rise to long-term problems with homework motivation and engagement for the child. The current study set out to measure scaffolding behaviour during homework while controlling for maternal scaffolding during another task free of associations with homework, in line with Murphey's recommendation that task-bound parenting practices should be distinguished from their 'cumulative interaction history' (Murphey, 1992).

While scaffolding research tends not to elaborate on different types of ineffective scaffolding (Carr & Pike, 2012), we intended to explore whether over-support or under-support during a non-homework task is related to later homework scaffolding quality. Our study also sought to investigate whether, controlling for mother's non-homework scaffolding in Year 1, mothers' scaffolding during homework with her child in Year 2 was related to her earlier reports of her attitudes to homework, her attributions to academic success, and her educational expectations for her child.

As well as controlling for prior non-homework scaffolding quality, we also controlled for variables that may confound the correlations. Maternal education level correlates positively with her expectations for her child's education level (Davis-Kean, 2005; Englund et al., 2004), as well as the accuracy of these expectations (Alexander, Entwisle, & Bedinger, 1994), and has been related to conducive learning environments at home (Smith, Brooks-Gunn, & Klebanov, 1997), involvement in homework (e.g., Keith et al., 1998), and scaffolding quality (Carr & Pike, 2012). Furthermore, many of the models that inform the current study identified child gender as a key factor (Davis-Kean, 2005; Eccles et al., 1982; Eccles, 1983; Marjoribanks, 1987). Most of the

research cited above investigated children within a small age range, and those studies that found an effect of child age were comparing differences across large age gaps (such as 8-13 years: Davis-Kean, 2005). However, our study focused on children right at the start of school, when developmental differences are more pronounced, and so we controlled for child's age too. As the child's actual cognitive ability is associated with the mother's expectations for the child (Englund et al., 2004), we anticipated that ability may also confound the results of our study.

Overall we hypothesised that the quality of a mother's support during homework would be affected by the maternal beliefs and attitudes she holds about education. Thus, we measured three different beliefs to capture a range of maternal positions on education. Our research question was: Controlling for earlier scaffolding, which maternal education-related beliefs predict later scaffolding quality during homework?

Method

Participants and Recruitment

This study was part of a larger longitudinal project. A database of families involved in infant research at the University of Sussex was used as initial contact; mothers whose child fell within Year 1 age (5-6 years old) were contacted using the email address they had provided five years earlier. Of the 176 families contacted, sixty (71% of the total sample in the study) agreed to participate. Fifteen more families (18%) were recruited by word-of-mouth from participants. A further ten (12%) responded to advertisements in local toy shops, book shops and supermarkets. All but five of the recruited families lived in the East and West Sussex region.

Forty-three (51%) of the participating children were boys. The socio-economic background of the households (using maternal education as a proxy measure) was relatively homogenous: only seventeen (20%) of the mothers had left education without

an undergraduate degree, and twenty-five mothers (29%) had postgraduate degrees. At the first visit, the children's mean age was 73 months (*SD* = 3.23), ranging between 65-80 months. Fifty children (59%) had one sibling, and twenty (23%) had two or more; fifteen (18%) had none. The sample was predominantly white British: one of the children was Black, and four (5%) lived in bilingual homes with one parent of non-British European or Eurasian descent.

For the follow-up visit, eighty-three of the mothers responded, and eighty families (94%) took part. Of the five families that did not participate, four were boys. The children of the families who only took part in the first time point scored significantly lower on verbal mental age, $t(78)=2.70$, $p<.005$.

The follow-up visits were arranged a year later (*M*=367 days, range = 317-478 days). At this second time point, the children's mean age in months was 85 (*SD* = 3.34), with a range of 77 to 92 months.

Procedure

The first visit was arranged in the family home after school or during the weekends or holidays. The first task was a joint problem-solving activity. The child was provided with an Etch-A-Sketch drawing toy, and shown the general mechanics of the drawing dials by the researcher. The child was then given an A4 laminated sheet with a shape (see Appendix I), and invited to try drawing the shape on the board. The child was told by the researcher that their mother was there to help if needed. The majority of children were not familiar with the Etch-A-Sketch, and almost all of the mothers reported having used one before. The researcher videotaped the interaction and left the room until they had finished. Following this, the mother was given a questionnaire to complete, while the child was administered the British Picture Vocabulary Scale 3

(BPVS 3: Dunn, Dunn & Styles, 2009) which generates a verbal mental age, in a separate room.

The follow-up visit took place on a day previously arranged to fall when the child would have homework. The mother and child were invited to start on the child's homework in the typical location, and to spend as much time on it as they normally would. The interaction was videotaped, with the researcher in a separate room.

Questionnaire Measures

Mother's education level. An item assessing maternal education level (Natriello & McDill, 1986) was adapted in line with the British education system (see Appendix D). Mothers were asked to select the highest qualification they had achieved from a list of pre-coded responses ranging from 1 ('left school without GCSEs') to 7 ('finished doctoral degree').

Attributions to school performance. The mothers' questionnaire included an item from Hyde and colleagues (Hyde et al., 2006), ranking the following four factors in order of importance for children's school performance: innate intelligence, home environment, studying hard, and good teacher (Appendix N). Eighty-three of the participating mothers gave complete data for the attribution ranking. Two only entered their first and last choice, and so the other factors were coded as missing. In cases where there were joint ratings these rankings were given the mean score. Ranks were reversed, such that higher scores represented more value attributed to that factor.

Attitudes towards homework. Cooper's questionnaire on beliefs and attitudes towards homework (Cooper et al., 1998) was included (Appendix L). Five items asked the mother about whether she feels positive about homework in general and whether she thinks it is helpful for different skills. Mothers rated on a 5-point Likert scale from not positive (1) to positive (5). To disentangle general homework attitudes to attitudes about

the child's homework specifically, we rephrased each item to be about her child. For example, we changed the item 'Do you think we homework helps students learn?' to 'Do you think homework helps your child in particular learn?'. This scale reached substantial internal consistency of α=.85.

Expectations of child's education level. Using the same pre-coded list of qualifications used to assess maternal level of education, mothers were asked to circle the highest level of education they expect their child will reach from 1 ('left school without GCSEs') to 7 ('finished doctoral degree'). This method of assessing expectations has been used in existing research (Englund et al., 2004; Galindo & Sheldon, 2012; Neuenschwander et al., 2007), and could be directly compared to mothers' own education (see Appendix O).

Video Coding

Etch-A-Sketch scaffolding at Time 1. Our coding scheme for the Etch-A-Sketch videos was categorised into: involvement; structure and directives; and autonomy support (Grolnick & Ryan, 1989). To distinguish between over-supportiveness and under-supportiveness as well as appropriate scaffolding, we developed a scale from 1 to 7 for each category, with 4 as an anchor of 'appropriate', and 1 and 7 denoting 'much too little' and 'much too much' (full coding scheme available in Appendix P).

Two coders independently coded each minute of the Etch-A-Sketch task videos for the first five minutes. The coders compared independent scores after each minute, and settled on an agreed score. Due to technical problems, 5 of the original 85 videos were not coded. Fourteen (17.5%) of the dyads finished within the five minutes, but only three lasted under three minutes, so the entirety of each video was used in analysis. Inter-rater reliability between the independent scores from the coders was reasonable,

α=.69 overall, with a two-way mixed, absolute agreement, single-measures intra-class correlation coefficient of .53 (see Mooney & Duval, 1993). The agreed codes were more reliable with the independent scores of both coder 1 (α=.87, ICC =.77) and coder 2 (α=.89, ICC =.80), and so were used in further analysis.

To create 'inappropriateness' scores within each category, the score of 4 ('appropriateness') was recoded as zero. We then created two scales of 'over-supportive' (scores over zero) and 'under-supportive' (scores below zero) of each category for every mother, using the mean of the number of minutes the mother scored above zero, and the same for all the scores below zero. Thus, in the end each mother had an 'over-supportive' and 'under-supportive' score for autonomy support, involvement and structure. *Data reduction*: To develop over-supportive and under-supportive constructs, principal components analysis was calculated on the data. Correlations showed that under-involved mothers tended to over-promote independence and give too little direction. This pattern was confirmed by the factor analysis, which yielded two distinct factors from the six scales, labelled *over*-supporting (with rotated loadings of .62, .84 and .89) and *under*-supporting (with loadings of .85, .79 and .76). These two factors were computed for each mother, and they correlated weakly, r=-.17, p<.09 (CI -.30, -.06).

Homework scaffolding at Time 2. Rather than use the same coding scheme for both tasks, we chose coding schemes that best fitted the characteristics of maternal behaviour in the two tasks, which were evaluated during the early training sessions. The coding scheme for the second set of videos was constructed similarly to that of the first; however, a measure of *emotional support* was included because we anticipated that positivity, praise and warmth a mother provides during homework may be influenced by her beliefs. We used the scaffolding coding scheme devised by Pianta and colleagues

(Pianta et al., 1991), which measures emotional support, quality of instruction, and respect for child's autonomy, coded from 1 to 5, with 5 being 'appropriate scaffolding' and 1 being 'inappropriate'. The scheme can be found in Appendix Q.

Two coders analysed the videos, and one coder of the Time 1 videos was used as a criterion coder. All the videos were double-coded in a similar format to the Time 1 videos; each coder scored the mother's scaffolding on the three dimensions independently, and then the coders settled on an agreed code. During training sessions, it was decided that ten minutes of homework coding, rather than five, was more suitable, because most of the homework videos were lasting longer than ten minutes (sixty-five in total, whereas only two dyads finished their homework in under 5 minutes), and because we anticipated that scaffolding during homework may change in quality more markedly over ten minutes than over five. Thus, the two coders produced independent and agreed codes for the first five minutes and again for the second. The agreed codes were again used, whose ICCs reached a mean of .80 with coder 1, and .84 with coder 2. The two agreed scores for the first five minutes and the second five minutes were averaged to get an overall score for each dimension of scaffolding. *Data reduction:* To create a construct of overall scaffolding quality as well as the separate scaffolding dimensions in later analyses, principal components analysis was conducted on the three dimensions: emotional support, quality of instruction and autonomy encouragement. All three dimensions inter-correlated, apart from encouragement of autonomy and emotional support. The factor analysis yielded one factor, labelled 'scaffolding quality', from these three dimensions, with loadings from .59 for autonomy support to .91 for quality of instruction. We used both the factor, and the separate dimensions, in the analysis.

Results

Descriptive Statistics and Preliminary Analysis

Means and standard deviations are displayed in Table 4.1.

Time 1 maternal beliefs. The most frequent rank order of attributions, from highest to lowest, was: home environment; good teacher; innate intelligence; and studying hard. Seventeen mothers (20%) ranked the factors in this order. Mothers were generally positive about homework, tending to give a high score. Mothers' expectations for their children's highest level of education were also high, with a mean of 5.1 (5 being 'Undergraduate degree'; 49 mothers (58%) selected this option). The lowest score was 1.5 (between 'Leave school without GCSEs' and 'Finish GCSEs'); only one mother selected this option. Three mothers (4%) selected the highest level. Expectations correlated with mother's own education level, r=.38, p<.001.

Table 4.1

Means, standard deviations and ranges of all variables

	Mean (*SD*)	Range
Time 1 variables		
Child's verbal mental age	106.6 (8.74)	81-129
Maternal attitudes to homework	2.9 (.86)	0-4
Maternal attributions to school success		
Home environment	3.27 (.92)	1-4
Good teacher	2.96 (.85)	1-4
Innate intelligence	2.16 (1.14)	1-4
Studying hard	1.59 (.69)	1-4
Mother's expectations for child's education level	5.09 (.93)	1.5-7
Maternal scaffolding during Etch-A-Sketch task		
Over-encouragement of independence	.10 (.37)	0-2
Under-encouragement of independence	.32 (.60)	0-2
Over-directive	.33 (.57)	0-2
Under-directive	.37 (.64)	0-2
Over-involved	.45 (.67)	0-3
Under-involved	.11 (.44)	0-3
Overall over-scaffolding	.36 (.49)	0-1.7
Overall under-scaffolding	.19 (.39)	0-2.3
Time 2 variables		
Maternal scaffolding during Etch-A-Sketch task		
Emotional support	4.26 (.89)	1.5-5
Quality of instruction	4.39 (.77)	2-5
Autonomy encouragement	4.56 (.60)	2.50-5
Overall scaffolding quality	4.40 (.60)	2.83-5

Scaffolding. At Time 1, mothers mainly displayed appropriate scaffolding on all three dimensions. On the scale of 0 to 3, mean scores for inappropriateness were close to zero. At Time 2 also, mothers got generally high scores for appropriate scaffolding.

Inter-correlations. Zero-order correlations (bootstrapped to 1,000 samples with bias-corrected acceleration) were calculated on the demographics and on the mother's questionnaire items at the first visit (see Table 4.2). *Between demographics and mother beliefs:* The mother's beliefs did not correlate with the child's age and verbal mental age at the first time point, $p>.05$ in all cases. Mothers of girls tended to have more positive attitudes towards homework than mothers of boys, $t(83) = -2.2$; $p<.05$. The mother's own education level did not correlate with her attitudes to homework. It did, however, strongly relate to the attribution of home environment to child's school success; mothers who reached higher education levels attributed home environment as more important than those with fewer qualifications. Similarly, mothers' education level was the only demographic variable correlating with her expectations for the child future education, whereas child age, gender and verbal IQ all yielded low and non-significant correlations. *Within maternal beliefs:* There were no correlations found between the three sets of beliefs: expectations, attitudes or attributions. It appears that these three beliefs are entirely independent of each other. *Demographics:* Zero-order correlations (bootstrapped to 1,000 samples with bias-corrected acceleration) were calculated between the demographics and the homework scaffolding, along with bootstrapped t-tests for child gender. None of these variables (child gender, age at Time 2, child verbal IQ, mother's education) were related to any of the dimensions of Time 2 scaffolding.

Overall scaffolding quality during homework at Time 2 was found to relate to *under*-involvement, but not over-involvement, during the Etch-A-Sketch task at Time 1 (see Table 4.3). Specifically, over-promotion of independence and under-involvement

during the Etch-A-Sketch interaction was related to lower quality instruction from the mother during homework, and less appropriate emotional support. This suggests that *under*-scaffolding in particular was associated with sub-optimal scaffolding during homework a year later; mothers who gave too *little* emotional support and too vague or unclear instructions were later less likely to deliver appropriate scaffolding for that child during homework. On the other hand, providing too much support was not related to later homework scaffolding.

Table 4.2
Zero-order correlations between the demographics and mothers' beliefs

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Gender	-								
2. Child age (T2)	.04 (-.19, .26)	-							
3. Child verbal mental age	-.06 (-.29, .19)	-.05 (-.24, .16)	-						
4. Mother education level	-.10 (-.33, .14)	-.18 (-.37, .02)	**.22*** **(-.04, .40)**	-					
5. Maternal homework attitudes	**.23*** **(.01, .41)**	.08 (-.18, .33)	-.16 (-.37, .02)	-.05 (-.25, .15)	-				
Attributions to school performance									
6. Home environment	-.14 (-.37, .07)	.01 (-.24, .21)	.04 (-.14, .23)	**.29**** **(.22, .55)**	-.13 (-.31, .07)	-			
7. Good teacher	.06 (-.17, .29)	-.01 (-.24, .22)	-.08 (-.31, .17)	-.21 (-.41, .01)	.07 (-.13, .28)	.19 (.01, .40)	-		
8. Innate intelligence	.19 (-.01, .40)	-.07 (-.31, .18)	-.01 (-.23, .20)	-.09 (-.32, .16)	.03 (-.19, .25)	**.53**** **(.36, .66)**	**.47**** **(.28, .64)**	-	
9. Studying hard	-.14 (-.38, .10)	.13 (-.08, .32)	-.04 (-.22, .13)	.02 (-.18, .22)	.05 (-.17, .25)	**.26*** **(-.04, .49)**	.12 (-.16, .32)	**.28*** **(.10, .49)**	-
10. Expectations for child	-.14 (-.33, .08)	-.16 (-.05, .36)	.21 (-.43, .06)	**.33**** **(.18, .53)**	-.17 (-.36, .10)	.01 (-.21, .23)	-.20 (-.04, -.37)	.02 (-.21, .21)	.09 (-.26, .07)

Note. Bivariate two-tailed listwise Pearson correlations, bootstrapped with 1,000 samples and bias-corrected accelerated confidence intervals. *p<.05 **p<.005.

Maternal Beliefs and Later Homework Scaffolding Quality

Correlations. Bootstrapped partial correlations were conducted on maternal beliefs at Time 1 and scaffolding quality during homework at Time 2, controlling for confounding variables (mother's education level, child gender, verbal mental age at Time 1 and age at Time 2). Time 1 over-scaffolding and under-scaffolding constructs were also controlled for, so as to test associations to homework specifically, accounting for the mother's typical scaffolding practices during non-homework tutored interactions. Results are displayed in Table 4.4.

Maternal attitudes to homework and expectations for child's education level were not associated with any of the dimensions of maternal scaffolding in Year 2. On the other hand, her attributions for school success were related to scaffolding; the more important the mother considered the home environment to be for children's success, the higher quality her overall scaffolding (specifically, the quality of her instruction, and the appropriateness of her encouragement of autonomy). Ranking innate intelligence highly was associated with less optimal encouragement of autonomy. The quality of the mother's emotional support during homework was not related to any of her earlier attributions to school success. Furthermore, the value the mother placed on studying hard and having a good teacher did not relate to her later scaffolding behaviour.

Table 4.3

Zero-order inter-correlations between maternal scaffolding at Time 1 Etch-A-Sketch and Time 2 homework

	1	2	3	4	5	6	7	8	9	10	11
Year 1 Etch-A-Sketch											
Promoting independence											
1. Over-promotion	-										
2. Under-promotion	-.15 (-.22, -.07)	-									
Structure, directives											
3. Over-directing	-.14 (-.23, -.06)	**.45** (.18, .67)**	-								
4. Under-directing	**.53** (.19, .72)**	.08 (-.17, .36)	**-.31** (-.40, -.23)**	-							
Involvement											
5. Over-involvement	-.13 (-.24, .04)	**.63** (.38, .77)**	**.32** (.11, .51)**	.00 (-.25, .24)	-						
6. Under-involvement	**.60** (-.03, .85)**	-.14 (-.21, -.08)	-.14 (-.21, -.07)	**.34** (.06, .60)**	-.17 (-.25, -.11)	-					
Scaffolding constructs											
7. Over-scaffolding	.17 (-.26, -.07)	**.87** (.78, .93)**	**.69** (.49, .86)**	-.08 (-.27, .14)	**.84** (.74, .92)**	-.19 (-.26, -.12)	-				
8. Under-scaffolding	**.83** (.48, .92)**	-.06 (-.19, .14)	**-.26* (-.35, -.20)**	**.83** (.73, .92)**	-.11 (-.25, .08)	**.75** (.42, .89)**	-.17 (-.29, -.10)	-			
Year 2 homework											
9. Emotional support	**-.27* (-.59, .10)**	-.07 (-.30, .16)	.19 (-.06, .28)	-.15 (-.47, .18)	.03 (-.29, .24)	**-.43** (-.67, -.04)**	.03 (-.20, .23)	**-.33** (-.60, .06)**	-		
10. Quality of instruction	**-.27* (-.60, .01)**	-.15 (.35, 03)	.08 (-.14, .25)	-.15 (-.44, .23)	-.11 (-.33, .13)	**-.39** (-.67, -.07)**	-.08 (-.32, -.12)	**-.32** (-.59, -.01)**	**.67** (.47, .81)**	-	
11. Autonomy encouragement	.06 (-.15, .18)	-.13 (-.39, .10)	.03 (-.17, .20)	-.08 (-.32, .14)	-.20 (-.44, .03)	-.03 (-.27, .14)	-.14 (-.40, .10)	-.04 (-.25, .12)	.19 (-.04, .47)	**.38** (.18, .62)**	-
12. Overall scaffolding	**-.23* (-.53, .08)**	-.14 (-.35, .06)	.10 (-.09, .25)	-.17 (-.43, .12)	-.10 (-.31, .11)	**-.39** (-.63, -.04)**	-.07 (-.29, .14)	**-.31** (-.54, -.00)**	**.85** (.74, .91)**	**.89** (.83, .93)**	**.59** (.40, .78)**

Note. Bivariate two-tailed listwise Pearson correlations, bootstrapped with 1,000 samples and bias-corrected accelerated confidence intervals. *p<.05 **p<.005.

Table 4.4

Correlates of maternal beliefs and attitudes at T1 with homework scaffolding at T2

	Overall scaffolding	Emotional support	Quality of instruction	Autonomy encouragement
Attitude to homework	.01 (-.27, .32)	-.05 (-.34, .30)	-.05 (-.27, .21)	.18 (-.05, .43)
Attributions to school success				
Home environment	**.32* (.07, .54)**	.14 (-12, .41)	**.34* (.11, .56)**	**.28* (.03, .48)**
Good teacher	-04 (-.17, .26)	.07 (-.11, .27)	-.03 (-.22, .20)	.04 (-.18, .28)
Innate intelligence	-.20 (-.44, .08)	-.05 (-.29, .20)	-.19 (-.44, .05)	**-.26* (-.49, .02)**
Studying hard	-.14 (-.37, .14)	-.21 (-.45, .06)	-.10 (-.34, .18)	.02 (-.18, .20)
Expectations for child	.13 (-.22, .41)	.19 (-.18, .49)	.23 (-.12, .53)	-.19 (-.36, -.00)

Note: Partial correlations, controlling for child gender, age at Time 2, verbal mental age at Time 1, mother education level and over- and under-scaffolding at Time 1. Correlations bootstrapped to 1,000 samples with 95% bias-corrected acceleration.

Can maternal scaffolding quality during homework be predicted by earlier maternal beliefs? To investigate whether maternal beliefs predict later homework scaffolding, a series of hierarchical regression models was conducted. Our first regression model examined predictors of T2 overall scaffolding quality during homework, and then we looked more specifically at the different aspects of scaffolding during the homework interaction. To examine prediction from maternal beliefs, controlling for earlier non-homework scaffolding quality, the demographic variables were entered at Step 1 along with over- and under-scaffolding factors from the Etch-A-Sketch interaction at Time 1, and then maternal attitudes, attributions and expectations were added at Step 2[1]. For the homework scaffolding model (see Table 4.5), Model 2 explained a moderate portion of the variation within T2 homework scaffolding, r=.55, r^2=.31, and approached a significant improvement on Model 1 (F change (5,61) =2.26, p=.06). Scaffolding during a non-homework task at Time 1 was the only predictor of later homework scaffolding; even after accounting for it in Model 2, no single maternal belief predicted homework scaffolding to a significant extent.

[1] As the attribution 'good teacher' reached the lowest effects in correlations with T2 scaffolding, it was removed from regression analysis.

Table 4.5

Hierarchical Regression of Maternal Beliefs Predicting Scaffolding During Homework

	T2 Homework Scaffolding				
				Bootstrap	
	B	*SE* B	β	*SE* B	CI (*)
Step 1					
Child gender	-.13	.14	-.11	.14	-.43, .16
Child age	-.02	.02	-.08	.02	-.05, .03
Child verbal IQ	-.00	.01	-.02	.01	-.02, .02
Mother education	.11	.07	.20	.07	-.04, .26
T1 Under-scaffolding	-.52	.17	-.36**	.23	-.89, -.01
T1 Over-scaffolding	-.15	.14	-.12	.14	-.44, .13
Step 2					
Child gender	-.12	.14	-.10	.15	-.43, .22
Child age	-.01	.02	-.07	.02	-.05, .03
Child verbal IQ	-.00	.01	-.02	.01	-.12, .01
Mother education	.03	.07	.05	.09	-.17, .22
T1 Under-scaffolding	-.58	.17	-.40**	.25	-.90, -.10
T1 Over-scaffolding	-.19	.14	-.08	.14	-.38, .15
Attitudes to homework	.04	.08	.06	.09	-.14, .30
Attributions to success					
Home environment	.17	.10	.26	.11	-.06, .37
Innate intelligence	-.06	.08	-.12	.08	-.21, .07
Studying hard	-.10	.12	-.11	.12	-.33, .13
Aspirations for child	.15	.09	.21	.15	-.14, .35

We ran identical regression analyses on maternal emotional support, quality of instruction and autonomy encouragement separately, in order to establish whether any particular dimension of scaffolding was predicted by maternal education beliefs (see Table 4.6). Neither emotional support nor autonomy was predicted by beliefs; however, both the importance of the home environment attribution and educational expectations for the child significantly predicted the mother's quality of instruction during homework. The bootstrapped confidence intervals cast doubt on the reliability of the predictive nature of education expectations, but the attribution of home environment held up against the stricter bootstrapping method.

Table 4.6

Hierarchical Regression Models of the Different Components of Homework Scaffolding and their Predictors

	Support					Instruction					Autonomy				
				Bootstrap					Bootstrap					Bootstrap	
	B	*SE* B	β	*SE* B	CI	B	*SE* B	β	*SE* B	CI	B	*SE* B	β	*SE* B	CI
Step 1															
Child gender	-.08	.22	-.05	.20	-.44, .33	-.04	.18	-.03	.17	-.40, .27	-.27	.14	-.22	.15	-.54, -.01
Child age	-.01	.03	-.04	.03	-.08, .06	-.02	.03	-.05	.02	-.06, .03	-.02	.02	-.13	.02	-.07, .02
Child verbal IQ	-.01	.01	-.07	.01	-.03, .02	.00	.01	.02	.01	-.02, .03	.00	.01	.01	.01	-.02, .02
Mother education	.15	.10	.18	.10	-.08, .36	.10	.09	.14	.09	-.07, .26	.08	.07	.15	.07	-.05, .21
T1 Under-scaffolding	-.78	.26	-.35	.42	-1.44, .16	-.55	.22	-.35	.31	-1.11, .90	-.13	.17	-.09	.18	-.62, .09
T1 Over-scaffolding	-.06	.21	-.03	.22	-.51, .36	-.23	.18	-.15	.18	-.59, .10	-.15	.15	-.12	.18	-.53, .20
Step 2															
Child gender	-.11	.22	-.06	.23	-.56, .35	.02	.17	.01	.18	-.38, .39	-.26	.14	-.22	.14	-.55, .05
Child age	.01	.03	.02	.04	-.06, .08	-.01	.03	-.03	.03	-.05, .03	-.03	.02	-.19	.02	-.08, .01
Child verbal IQ	-01	.01	-.09	.01	-.03, .01	.00	.01	.01	.01	-.02, .02	.01	.01	.07	.01	-.01, .02
Mother education	.08	.11	.10	.13	-.20, .35	-.14	.09	-.06	.11	-.28, .18	.05	.07	.09	.08	-.10, .21
T1 Under-scaffolding	-.79	.27	**-.36***	.43	-1.40, .23	-.79	.21	**-.42****	.32	-1.22, .04	-.18	.18	-.12	.20	-.67, .07
T1 Over-scaffolding	.19	.21	.01	.20	-.37, .41	-.18	.17	-.12	.16	-.52, .11	-.13	.14	-.11	.19	-.51, .25
Attitudes to homework	-.00	.13	-.00	.15	-.26, .36	.01	.10	-.02	.10	-.19, .29	.12	.09	.16	.09	-.06, .33
Attributions to success															
Home environment	.04	.16	.04	.15	-.20, .30	.28	.13	**.34***	.15	.02, .56	.17	.01	.26	.11	-.06, .40
Innate intelligence	-.10	.13	-.12	.11	-.29, .09	-.05	.10	-.07	.10	-.22, .15	-.05	.08	-.09	.10	-.27, .14
Studying hard	-.31	.19	-.24	.17	-.62, .03	-.04	.15	-.04	.16	-.30, .26	.07	.12	.07	.13	-.20, .37
Expectations for child	.26	.13	.24	.24	-.22, .64	.27	.11	**.30***	.19	-.10, .58	-.09	.09	-.12	.09	-.28, .07

Discussion

Looking across two time points, this study set out to examine how maternal beliefs about learning, homework and her child's academic prospects may predict her scaffolding during homework in the early school years. We established that even when controlling for her earlier scaffolding behaviour during a non-homework task, the quality of maternal homework scaffolding was associated with earlier attributions to learning and expectations for her child. To our knowledge, this exploration of over- versus under-support is the first of its kind, and the pattern our data yielded may be specific to homework.

Can Maternal Beliefs Predict Homework Scaffolding Quality?

This study showed that the established link between maternal beliefs and behaviour around her children exists within the homework context (as hypothesised by Cooper et al., 1998). Guided by existing theory, we measured three different beliefs deemed relevant to homework: attitudes to homework, attributions to school success, and educational expectations. Of these three beliefs, attributions to school success, particularly the attribution of the home environment, predicted later quality of instruction during homework. This is especially striking given that this finding exists even when mothers' historic typical scaffolding style has been taken into account.

Attributions to school success. Maternal attributions to school success were found to correlate with scaffolding during homework, and to predict the quality of the instruction the mothers provide. The mothers in our study tended to consider the home environment to be the most important factor for children's success (contradicting the findings of relatively comparable samples, which found good teachers and innate intelligence are more highly attributed to success: Hyde et al., 2006), and those who

valued other factors over the home environment displayed lower quality scaffolding during homework a year later.

This study extends existing literature on maternal attributions to learning, identifying that differences in attributions actually relate to differences in maternal behaviour. While variance in emotional support (praise, affection and general warmth) was not related to these attributions, the cognitive tutoring strategies were more appropriate in mothers who consider the home to be important to school success. This finding suggests that mothers who put other factors ahead of the home environment may be less sensitive to optimal tutoring support during homework sessions. A mother's personal construction of her own role in her child's education dictates whether or not she gets involved in their education (Hoover-Dempsey & Sandler, 1995), and this study builds on this to show that the role mothers construct also may affect the *quality* of their involvement in homework. Alternatively, mothers who are less able to provide high-quality scaffolding may not see the benefits of the home environment in their children's progress and development.

Attitudes towards homework. A mother's attitudes towards her child's homework had minimal relation to scaffolding during homework. Maternal homework attitudes predict students' own attitudes and grades (Cooper et al., 1998); and maternal attitudes influencing her behaviour during homework might have explained this link. However, our findings show that mothers with less positive attitudes towards homework may not let these attitudes affect them in practice, even when their attitudes pertain to that particular child's homework. Given that attitudes and attributions were not related, mothers who believe that homework had little value may still believe that maternal tutoring, and collaborative learning in the home, is important – and this latter belief in particular may motivate the mother to behave contingently and sensitively to the child's

cognitive and emotional needs during homework. An alternative explanation is that maternal homework attitudes are not a factor in her support in the early school years; they might only matter when the child is older, and homework is more pressurised.

Expectations for child's education. Despite existing literature proposing that a mother's expectations for her child affect her behaviour (e.g., Davis-Kean, 2005; Hess, Holloway, Dickson, & Price, 1984; Seginer, 1983), our study found it had little bearing on her scaffolding behaviour during homework interactions, only approaching significance. This may be due to the low variance of the expectation scores across a large scale. It appears that after taking account of her own education level in our sample, expectations marginally predicted her instruction quality specifically. While we are cautious to avoid over-interpreting this finding, it is noteworthy that this predictor stands up to traditional significance tests with a small sample size and after factoring in many other influencing variables.

Maternal education level was related to expectations for their child's education level, but also played a role in the attribution of the home environment for their child's learning (as suggested by Scott-Jones, 1995). It seems, then, that mothers who have spent longer in education consider innate intelligence, good teachers and studying hard to be less important for academic achievement than the home environment.

Limitations and Future Directions

This study had limitations, which may inform development and refinement for future studies in this area.

The homework tasks provided by the teacher in this study were noticeably varied, both in content and in difficulty – some were mathematics activities, some spelling or writing. Parents of older children convey the value of specific school subjects, which is internalised by the child (Scott-Jones, 1995), and this may be

happening during the homework activities we videotaped. While this is a drawback of using ecologically valid methodology, we addressed this issue by partialling out scaffolding behaviour during a standardised task. In addition, it is striking that the effects were moderate, and significant, even with such varied content during homework tasks.

Our data did not allow for us to ascertain the pervasiveness and stability of maternal beliefs. However, we interpret the associations that we found exist over time to be important regardless of the stability of these beliefs. As we had no earlier measure of homework scaffolding, we cannot specify whether the mothers' scaffolding quality during homework had already been established by the first visit. Homework at Year 1 of school was generally reported by the mothers to be reading a school book or a book from home, and was rarely formally audited or marked, so we anticipated that maternal beliefs were more likely to relate to mothers' scaffolding a year later, when homework tended to be more formalised.

It is also important to exercise caution when interpreting findings from small sample sizes. The mothers who participated were generally well-educated, scaffolded well, and had positive beliefs about homework and high expectations their child. Bootstrapping goes some way to rectify the lack of variance, and its confidence intervals aid our interpretations; however, a larger sample would allow for detection of smaller effects, and examination of more complex interactions. Furthermore, ethnicity and race is known to play a substantial role in the effect of beliefs on behaviours (e.g., Davis-Kean, 2005), and our sample was overwhelmingly White. Moreover, there have been links between socioeconomic status and autonomy support during homework (Cooper et al., 2000). Thus, we cannot extrapolate too far from our sample; the participating mothers all presumably have enough positive experiences with school, and

an interest in the topic, to participate over two years. With this limitation in mind, it is notable that significant, albeit moderate, effects were found in such a small, relatively homogenous sample, and these effects might be taken as conservative estimates of the larger population. Moreover, we can only speculate how the variances in beliefs may play out in families with much less interest or investment in education, which is an area ripe for further investigation.

Finally, the measure for homework attitudes asked how much mothers agreed with positive, but not negative, statements. There were no items asking mothers how much they agreed that, for example, homework is 'a waste of time' or 'takes away from quality family time and playing'. Some mothers feel disenfranchised with and negative about homework (Corno, 1996; Patall et al., 2008; Solomon et al., 2002); in this study many of the mothers complained to the visiting researcher that homework is a drain at this age for the child and family. Mothers may hold both positive beliefs (e.g., homework is important for children's learning) and negative ones (e.g., homework causes conflict and tension within the family) simultaneously, and it may be negative attitudes, rather than the absence of positive attitudes, that relate to the quality of the support she gives while doing homework with her child. Future studies into homework attitudes may address this by including both sets of statements.

Concluding Remarks

This study sheds light on the complex, and often inconsistent picture of maternal help with homework. Maternal instructional scaffolding during homework in Year 2 related to her maternal beliefs about her own role in the child's education and her educational expectations for her child, even when taking account of her scaffolding style on non-homework tasks. Given the extent of the literature linking maternal behaviour to child outcomes (e.g., Linver et al., 2002), the implications for the role of

scaffolding quality during homework are substantial. By providing less optimal scaffolding, mothers may unwittingly make the homework experience more challenging, hard to manage and perhaps frustrating for both herself and her child. As homework is used so widely throughout the school years as a supplement to children's education, this interaction style during homework, cumulatively over the years, may go on to have enduring negative effects for the child's educational outcomes. Intervention research in many fields of psychology (such as health psychology and clinical psychology) target beliefs to change behaviour (Frey, Nolen, Van Schoiack-Edstrom & Hirschstein, 2005). This study suggests that for the potential benefits of the homework experience to be felt, there may be scope for schools to support parents' recognition of their own value in their child's education success, and of the benefits of having positive expectations for their children's school experience.

Chapter 5:

Paper 4 – Scaffolding under the Microscope: Applying Self-Regulation and Other-Regulation Perspectives to a Scaffolded Task

Abstract

Typical scaffolding coding schemes provide overall scores to compare across a sample. As such, many fail to reflect insights into the scaffolding process: the child's contribution to the learning; the particular skills being taught and learned; and the overall changes in amount of scaffolding over the course of the task. This paper applies a *transition of regulation* framework to scaffolding coding, using a self-regulation and other-regulation coding scheme, to develop rich and detailed data on mother-child dyadic interactions. Data of seventy-eight mother-child dyads (*M* age = 9 years 10 months) from the Sisters and Brothers Study (SIBS: Pike et al., 2006) were used for this analysis. Videos of the mother and child completing a block design puzzle task at home were coded for their different self- and other-regulation skills at the end of every block design trial. The constructs were examined at a sample level, providing general findings about typical patterns of self-regulation and other-regulation skills over the course of the task. Seven exemplar families at different ends of the spectrum were then extracted for more fine-grained examination, highlighting substantial trial- and behaviour-related differences between the families. This coding scheme demonstrated the value of exploring alternative perspectives of a mother-child tutoring task, and investigating features of the interaction that are rarely covered in existing scaffolding coding schemes.

Introduction

The metaphor of ‘scaffolding’ to describe the tutored learning interaction is now entering its fifth decade. Borne out of observations of mothers tutoring their children’s tower-building (Wood et al., 1976), the term is used throughout developmental and cognitive psychology, and has been changed, adapted, and applied to diverse topics (Granott, 2005). Emerging from the original concept came multiple operationalisations for empirical studies. These diverse operationalisations either do not reach consensus on, or tend to not fully capture, three aspects of the tutoring experience: the child’s role in their own learning within a scaffolding interaction; the particular learning behaviours and skills being developed within the task; and the dynamic unfolding over the course of a task. While reconfiguring and developing the original scaffolding metaphor for empirical studies is a welcome scientific endeavour (Granott, 2005), there is value in looking back to the original ideas from which it emerged (e.g., Gauvain, 2005; Lajoie, 2005). This paper applies a *transition of regulation* framework to scaffolding coding, using a self-regulation and other-regulation coding scheme, to draw out these three distinct aspects of the scaffolding interaction.

Scaffolding: its Strengths and its Weaknesses

The metaphor of scaffolding was developed during a time of increasing emphasis on the social role of learning: how experts in a skill help a novice develop that same skill. David Wood and colleagues (Wood et al., 1976) reported their observations during a tutored task between a mother and a young child, describing the naturally-occurring cognitive support the mother provided. They labelled the quality of this support ‘scaffolding’: much as physical scaffolding is constructed around an incomplete structure during the work phase until it is strong enough to stand without the support,

scaffolding sees the adult " 'controlling' those elements of the task that are initially beyond the learner's capacity" (Wood et al., 1976, p. 90). Crucial to the delivery of effective scaffolding were three principles: *contingent shifting*, whereby the adult adjusts the level of involvement according to the difficulty the child is showing at any given time; *fading*, which describes the gradual decrease in support over the course of the task; and a continuing *transfer of responsibility* of the activity from parent to child by the end of the task.

As the concept grew in popularity, the early qualitative work gave way to new quantitative practices. Operationalised measures have established that not all tutors provide this optimal scaffolding, and these measures have produced a wealth of valuable research, linking effective scaffolding by parents to positive learning consequences, including increased cognitive outcomes (Mulvaney et al., 2006), executive function (Hammond et al., 2012), and motivation (Pino-Pasternak, 2014). Correlates of effective scaffolding (like maternal personality, child temperament, attachment, and socio-economic circumstances: Carr & Pike, 2012; Gauvain & Fagot, 1995; Meins, 1997) have also been found. However, some areas of the scaffolding process have received little attention, and these are explored in this paper.

Developing self-regulated learning. Scaffolding measures have differed in how they classify and differentiate between aspects of the tutoring process. The original scaffolding coding (Wood et al., 1976) consisted of six distinct strategies mothers used to scaffold their child: recruitment, reduction of degrees of freedom, direction maintenance, marking critical features, frustration control, and demonstration. This has since been adjusted and refined in different studies. Some do not differentiate between *aspects* of maternal support, instead rating the mother overall on the *level* of her support (e.g., Carr & Pike, 2012; Conner & Cross, 2003; Fernandes-Richards, 2006; Pratt, Kerig,

Cowan, & Cowan, 1988; Wood, Wood, Ainsworth, & O'Malley, 1995) or the *appropriateness* of her support (e.g., Englund, Luckner, Whaley, & Egeland, 2004; Hammond et al., 2012). Others have separated out particular strategies the mother may use, but there is little consensus from one coding scheme to another. For example, Hyde and colleagues (Hyde et al., 2006; Lindberg et al., 2008) specified a different collection of behaviours to Wood's originals; and Pianta's scheme (Pianta & Harbers, 1996; Pianta et al., 1991) categorised them according to the underlying intention (e.g., supportive presence, quality of instruction, and respect for child's autonomy). These various categorisations directly reflect what the mother is doing, but doesn't manage to capture *how* the child is actually learning; that is, what particular tutoring and learning behaviours make fading, transfer of responsibility and contingency effective.

One early and influential account of tutoring and learning behaviours was proposed by Wertsch (1979). His observations of mother-child tutoring interactions mapped Vygotskian theories of socio-cognitive learning (Vygotsky, 1978) onto actual adult-child exchanges. He emphasised that in tutored sessions children develop the *self-regulation* skills required for the task. By extension, adults are demonstrating and modelling these self-regulation skills for the child: *other-regulating*. Scaffolding can then be seen as the strategies the mother uses to aid the *transfer of regulation* over to the child over the course of the task. This regulation perspective has since been used to describe the tutoring process more generally (e.g., Díaz, Neal, & Amaya-Williams, 1990; Lajoie, 2005).

Given that statistical links between maternal scaffolding quality and children's later self-regulation skills (e.g., Neitzel & Stright, 2003; Stright, Neitzel, Sears, & Hoke-Sinex, 2001) support this position, it is curious that *other-regulation* has rarely been operationalised for tutoring research (two exceptions are Nader-Grosbois,

Normandeau, Ricard-Cossette, & Quintal, 2008; and Hadwin, Wozney, & Pontin, 2005). Instead, they are more readily applied to hypermedia and technology as the other-regulator (see Lajoie, 2005), rather than human-to-human interactions. The self-regulatory skills that are internalised during a scaffolding interaction tend not to be examined, so few self- and other-regulation coding schemes exist.

The child's contribution to task success. While the tutor's behaviour and skills are crucial to the process and product of a didactic interaction, the contribution of the child is also a determining factor; the child's own efforts and strategies "*assists the adult to assist*" (Tharp & Gallimore, 1998, p. 101, original italics). Vygotsky (1978) described learning as an *internalisation* by children of behaviours externally modelled by the 'expert' other during this *transition of regulation*, which requires effort on behalf of the child; as such, they are active participants in their own learning experience. In scaffolding measures, however, the child's input is rarely directly considered in its own right; instead, the child's behaviour (either prior to or directly after an intervention by the tutor) is typically used as a device for judging the adequacy of the tutor's scaffolding (e.g., Carr & Pike, 2012; Conner & Cross, 2003; Pratt et al., 1988). The child's success at the task, therefore, is attributed entirely to the adult's help, not to the child's responsiveness, nor their ability to retain and apply the other-regulated skills. As such, little is known about the child's own self-regulatory development over the course of a scaffolding interaction.

Change during a learning session. In his detailed observation of self- and other-regulation, Wertsch (1979) described how, as the child develops experience, knowledge and confidence, the mother gradually displays fewer other-regulating behaviours over the course of the task; 'fading', following a transition of responsibility principle. Analysis of behaviours at fine-grained levels such as these have been used

within scaffolding research; however, they are often then compiled into a global 'scaffolding' score for the mother (e.g., Carr & Pike, 2012; Wood, Wood, & Middleton, 1978), and thus important information about changes over time is lost. Micro-developmental methods, which provide data showing changes across a single interaction, capture "real-time… evolution of skills and abilities of development and learning" (Granott & Parziale, 2002, p. 1). This more process-oriented approach has the potential to map the appropriate self-regulation skills as they emerge, get practised and refined, and eventually become automatic and high-level behaviours in the child. In parallel, there is scope to follow the other-regulating strategies of the mother as the task progresses, and how she intervenes at episodes of particular challenge. The bidirectional nature of dyadic interactions (as depicted in the transactional account of social learning: Sameroff, 2009) emphasises that observing responses and reactions within the dyad to each other's behaviour provides information on the "complex interplay of dynamic systems" (Sameroff & Mackenzie, 2003, p. 619). As such, it is particularly suited to mapping the dynamic of scaffolding (van Geert & Steenbeek, 2005), and could provide rich and detailed information on the scaffolded learning process (see Van de Pol & Elbers, 2013, for an example).

The Current Study

In this study, we aimed to bring detailed, process-oriented, and dynamic analyses from the early scaffolding literature to the more quantitative, outcome-focused assessments of scaffolding quality more commonly used in recent years. We describe a method of conceptualising and operationalising the scaffolded interaction in keeping with Wertsch (1979) that addresses the three issues raised above: differentiating between types of other-regulatory and self-regulatory behaviours present in a scaffolding interaction; incorporating the child's contribution to the learning process;

and mapping child and mother behaviour over the course of a task. Drawing on fine-grained coding practices, we investigated the learning process during a videotaped task involving a series of trials that increase in difficulty, in which mother scaffolds child (see Carr & Pike, 2012). We aimed to develop a coding scheme that lends itself to assessing sample-level trends, as well as specific characteristics of individual mother-child dyads. Thus, our descriptive account of this alternative interpretation of the 'scaffolded' interaction is examined through both a large data set and particular exemplars, looking in fine detail at self-regulating behaviours by the child, and other-regulating behaviours by the mother, as they progress through the task.

Methods

Sample and Recruitment

The longitudinal data set from the Sisters and Brothers Study (SIBS: Pike et al., 2006) was reanalysed for this study. Mothers and children were recruited through mainstream schools in the South of England. The inclusion criterion at the recruitment stage was that the child had at least one older sibling (for more details, see Coldwell et al., 2006), which left ninety dyads. Twelve were further discounted following further exclusions in the procedure, detailed below. Of the remaining children, 36 (46%) were girls. The children's mean age was 9 years 10 months (*SD* = 11.14, range = 8y - 11y 11m). Thirty-five mothers (45%) had no education beyond secondary school level, twenty (25%) had a college education and vocational training, and twenty-three (30%) had undergraduate or postgraduate qualifications.

Procedure

The mother and child were visited in the family home. The child was asked to complete the block design puzzle task adapted from the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974). With both mother and child seated on the floor or

at a table, the child was provided with nine wooden blocks, and a booklet featuring ten four- and nine-block designs, increasing in complexity (see Appendix R). They were instructed by the researcher to use the blocks to make a copy of the design, and once they had finished a design they could move onto the next trial. The child was asked to work through the booklet in his or her own time, and told that their mother was there to help them if they needed. The mothers were given basic instructions ("Each square is one block. Some of the designs use only four blocks but the ones towards the end use all nine blocks."). This activity was videotaped for later coding. In cases where the mother stated her own inability to do the block design task ("I don't think I can do this either"), the mother-child dyad was removed from analysis entirely; this was because in these cases the mother was not meeting the assumption in scaffolding that the 'knowledgeable other' can complete the task themselves.

Behaviour Coding

Since Wertsch's pioneering detailed observations of the transfer of regulation, few coding schemes looking at transfer of regulation have been devised and validated. We used the self- and other-regulation coding scheme developed for dyadic tasks by Nader-Grosbois and colleagues (Nader-Grosbois & Lefèvre, 2011, 2012; Nader-Grosbois et al., 2008). The scheme has been used primarily to compare overall child self-regulation between groups; either comparing typically developing children with children with intellectual disabilities, or computer-based tasks with physical ones (Nader-Grosbois & Lefèvre, 2011). It has also been used to assess group-level self-regulation over the course of a task (Nader-Grosbois et al., 2008). Equivalent parental other-regulation scores have also been devised, and correlated with the children's scores (Nader-Grosbois & Lefèvre, 2012).

We treated the first three trials in Wechsler's task as practice rounds, to give the child an opportunity to learn the nature of the task. Of the seven aspects of regulation from the original coding scheme, six were included to measure child self-regulation (CSR):

- Exploration of means and planning (e.g. "I might start at the top corner");
- Joint attention (e.g. following points);
- Management (involvement and control of task);
- Attention;
- Motivation; and
- Evaluation (e.g. checking against the booklet before moving onto the next trial).

We removed 'identification of objective' because the objective of each trial did not change after the practice rounds (the adapted coding scheme can be found in Appendix S). These same six items were used to measure mother's other-regulatory behaviours, or MOR (e.g. for exploration of means, a mother suggests to the child that it may be useful to break down the design into parts). We extended the three-point scale of the original coding scheme (Nader-Grosbois & Lefèvre, 2012) to four points, in order to increase sensitivity. In the CSR coding scheme 1 was high display of that particular regulatory behaviour and 4 was low display. In the mirroring MOR coding scheme, these same items were reverse-coded at the coding stage, such that 1 was associated with low other-regulation. According to the type of behaviour measured, some behaviours were coded for frequency (e.g., '3 instances or more'), others for proportion (e.g., 'throughout'), and others for extent (e.g., 'moderate'). For each of the seven completed trials, the mother was rated on the six MOR behaviours, and the child on the six CSR behaviours. This yielded a total of 48 codes per individual, and 84 per dyad.

Fifteen percent of the videos were double-coded to check for inter-rater agreement. Percentage agreement was 94% to within one point on the scale (74% perfect agreement). Correlations between coders on each item were on average .92, ranging from .70 (child joint attention) to .99 (child motivation).

Data Reduction

With such dense data collected on each family, we reduced the data in different ways. We first created variables for each code of a particular behaviour over all trials, to generate a score of how much of that behaviour children and mothers displayed on average. In addition, we wanted to capture the overall amount of CSR and MOR during each trial, so we averaged across the specific regulatory behaviours at each trial. We calculated reliability for each behaviour type over the course of the task. For MOR, the mean alpha was .76, varying from α = .83 (joint attention) to α = .64 (evaluation). For CSR, the reliability was lower, mean α = .61, varying from α = .76 (exploration of means and planning) to α = .45 (joint attention).

For CSR in a particular behaviour, we calculated the mean score of that behaviour across the seven trials, giving an overall score of the extent of their self-regulation in that behaviour across the task. We did the same for the MOR for each behaviour. To look at change in mother's and child's regulation over the course of the task, we computed overall CSR and MOR for each trial. Principal component analysis of regulatory behaviours at each trial, and subsequent reliability tests, yielded a robust single 'child self-regulation' factor, including all six behaviour types (planning, joint attention, management, motivation, attention and evaluation). The reliability of this construct had a mean α of .66 (varying from .54 at design 5 to .72 for design 4)[2]. These

[2] We chose to retain all items for the child self-regulation because there was no single item (or combination of items) which, when removed, consistently and substantially

scores during each individual trial were combined to get a mean score of CSR at that particular trial. The mothers' other-regulatory behaviours yielded a single factor of planning, joint attention, management, and evaluation (with a mean alpha of .79, varying from .75 at trial 9 and .87 at trial 4); attention and motivation did not load onto this factor. As with the child data, the mean of these four scores then produced MOR at each trial. Finally, to create an overall CSR score, we used the mean of the CSR scores across all seven trials; we computed an equivalent score for overall MOR in the same way.

Results

Part One: General Findings across the Sample

Many scaffolding coding schemes provide overall scores for each mother-child dyad, which can then be compared with the rest of the sample. We did the equivalent of this by using our overall MOR and CSR scores (averaged across trials) to show trends across the sample (Table 5.1). Overall, children showed high self-regulation in the task, and the mothers showed low other-regulation.

---

increased the alpha scores across designs. While these low alpha scores suggest questionable reliability, it is in line with reliability commonly found within constructs of social science data (Field, 2013).

Table 5.1
Means, standard deviations and ranges of self- and other-regulation

Demographics	**Mean (*SD*)**	**Range**
Mother's education level (T1)	3.42 (1.5)	1 – 6
Child's verbal mental age (T1)	109 (9.0)	86 – 129
Child's age (T2)	118.6 (10.8)	97 – 140
Child self-regulation		
Overall	3.68 (.25)	2.76 – 4.00
By behaviour type		
Planning	3.47 (.51)	1.86 – 4.00
Joint attention	3.82 (.21)	3.14 – 4.00
Behaviour regulation	3.54 (.45)	2.43 – 4.00
Attention	3.89 (.20)	3.14 – 4.00
Motivation	3.79 (.30)	2.86 – 4.00
Evaluation	3.58 (.43)	1.71 – 4.00
By trial		
Design 1	3.88 (.22)	2.83 – 4.00
Design 2	3.68 (.35)	2.67 – 4.00
Design 3	3.73 (.41)	2.17 – 4.00
Design 4	3.91 (.22)	2.83 – 4.00
Design 5	3.65 (.41)	2.00 – 4.00
Design 6	3.51 (.44)	1.67 – 4.00
Design 7	3.42 (.54)	1.83 – 4.00
Mother other-regulation		
Overall *	1.70 (.48)	1.03 – 3.03
By behaviour type		
Planning	1.96 (.58)	1.00 – 3.57
Joint attention	1.96 (.67)	1.00 – 3.86
Behaviour regulation	1.65 (.53)	1.00 – 3.00
Attention	1.06 (.16)	1.00 – 2.00
Motivation	1.47 (.46)	1.00 – 3.14
Evaluation	1.43 (.47)	1.00 – 3.57
By trial *		
Design 1	1.38 (.59)	1.00 – 3.75
Design 2	1.73 (.67)	1.00 – 3.75
Design 3	1.65 (.75)	1.00 – 4.00
Design 4	1.26 (.48)	1.00 – 3.00
Design 5	1.84 (.69)	1.00 – 3.25
Design 6	2.15 (.75)	1.00 – 4.00
Design 7	2.22 (.69)	1.00 – 4.00

* This construct uses the four other-regulation behaviours of joint attention, planning, behaviour regulation and evaluation, as per the factor analysis.

We also used the constructs of behaviour *types* to show trends across the sample (Table 5.2). Repeated-measures analysis of variance, with Greenhouse-Geisser correction, confirmed that the types of self-regulation behaviour differed significantly, $F(3.50) = 26.35$, $p<.001$. The self-regulatory behaviours that the children in our sample showed most strongly were attention and joint attention, for which no child scored under 3.14. Children were least self-regulated in their planning and in their management of the task. Particularly, some children within our sample scored as low as 1.86 overall for regulating their planning skills. It appeared, then, that children were stronger in responsive self-regulation behaviours, rather than the initiating, strategic ones. This also highlights the demands of this task in particular; attention regulation is a general, practiced skill, whereas planning in these trials is more challenging (and is variable, given that the task is used to measure IQ).

Table 5.2

Correlations between MOR and CSR at behaviour level and at trial level

Behaviours	
Planning	-.72
Joint attention	-.32
Management	-.47
Attention	-.80
Motivation	-.32
Evaluation	-.86
Trials	
Trial 1	-.70
Trial 2	-.66
Trial 3	-.80
Trial 4	-.79
Trial 5	-.63
Trial 6	-.59
Trial 7	-.58

Note. Bootstrapped listwise two-tailed correlations. $p<.01$ in all cases.

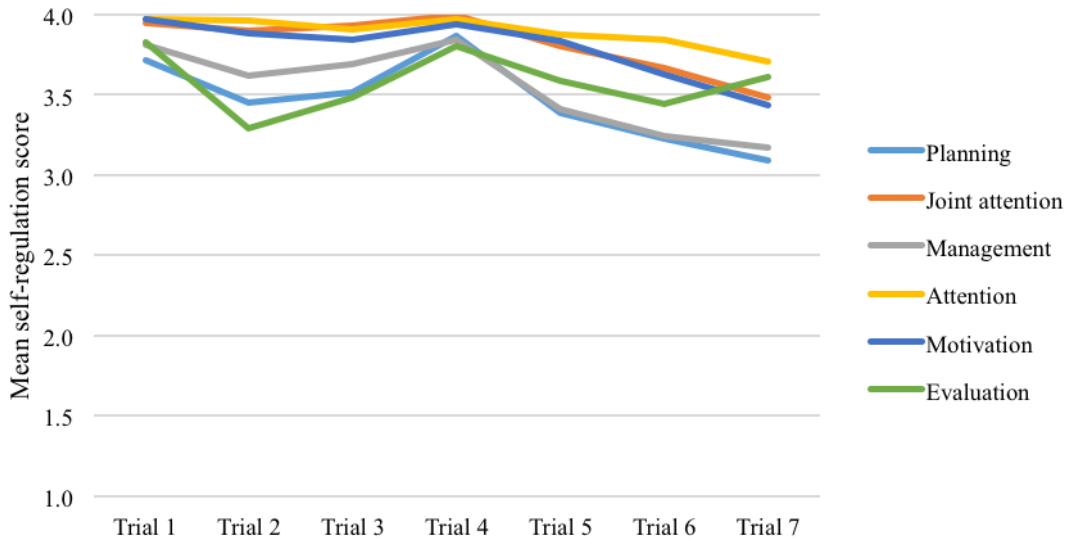
Means of MOR behaviour types also varied to a significant extent, $F(3.37) = 67.39$, $p<.001$ (Greenhouse-Geisser corrected). Most notably, mothers other-regulated the child's attention very little, whereas they other-regulated most in planning and in joint attention. In general, there appear to be complementary patterns of these sub-components of mother and child regulation; if the children generally scored highly in a given behaviour type, the mothers generally had lower MOR scores of that behaviour type. This complementarity provides some validation of this coding method.

We also used our data to look at general trends in maternal other-regulation and child self-regulation over the course of the trials. Mean scores of each behaviour type were used to chart change from one trial to another (see Figs 5.1 and 5.2). A one-way repeated-measures ANOVA with Greenhouse-Geisser correction confirmed that overall

CSR was significantly different between trials, $F(4.67) = 24.32$, $p<.001$. In Figure 5.1, trials 1 and 4 have peaks of high self-regulation. Given these two trials are no more challenging than the one preceding them, it is unsurprising that children can self-regulate well. Pairwise comparisons confirmed that overall self-regulation scores changed significantly between trials 1 to 2, trials 3 to 4, 4 to 5 and 6 to 7 ($p<.05$ in these cases). At trial 2, we see a drop of average self-regulation in the children's planning, management, and evaluation. Trials 3 and then 4 show a recovery of these CSR behaviours. There is a general downwards trajectory of self-regulation after Trial 4, most pronounced in planning and in management of the task. Only in the last three trials do attention and motivation start to drop. Evaluation is the only CSR behaviour that recovers during the final three trials. This general drop-off may be because task fatigue by trial 5 affects the children's self-regulation; attention, joint attention and motivation have decreased at this stage, and so it may be a general trend that once these start to drop, then planning and management can no longer be well-regulated.

Figure 5.1

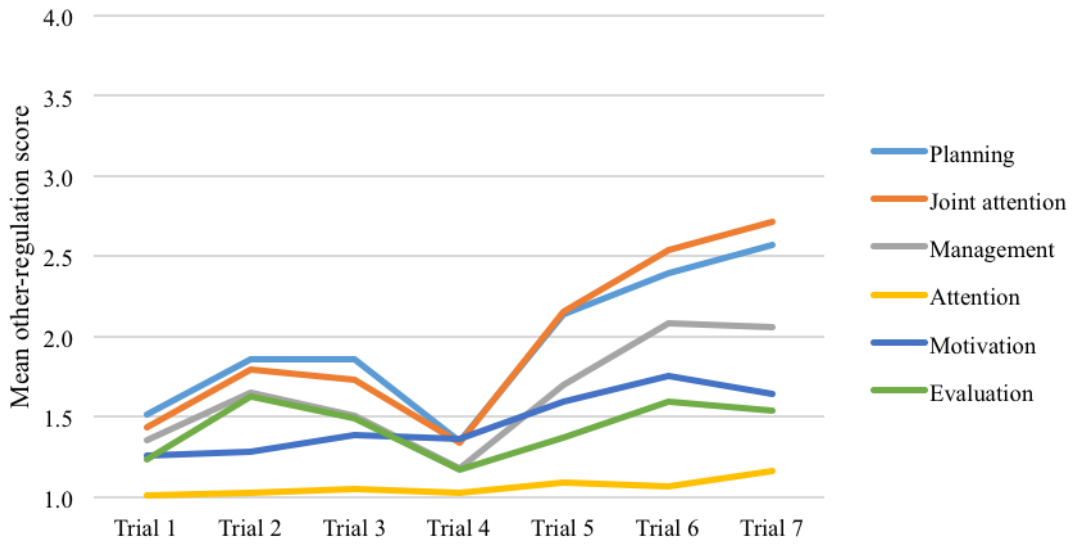
Mean scores of child self-regulation behaviours at each trial



The mothers' mean other-regulation also changed significantly over the course of the task, $F(5.20) = 43.10$, $p<.01$. Pairwise comparisons confirm significant differences between overall MOR from trial 1 to 2, trial 3 to 4, 4 to 5, and 5 to 6 ($p<.001$ in these cases). The pattern of behaviour type changes over time (Fig. 2) is a complementary mirroring of the children's. The increase in other-regulation of attention and motivation is negligible throughout. The other behaviours appear to be affected by the features of the trial; as with CSR, MOR is at its lowest during trial 4. Mothers showed the most other-regulation in planning and joint attention. Evaluation was comparatively low, and did not increase over the course of the task.

Figure 5.2

Mean scores of maternal other-regulation behaviours at each trial



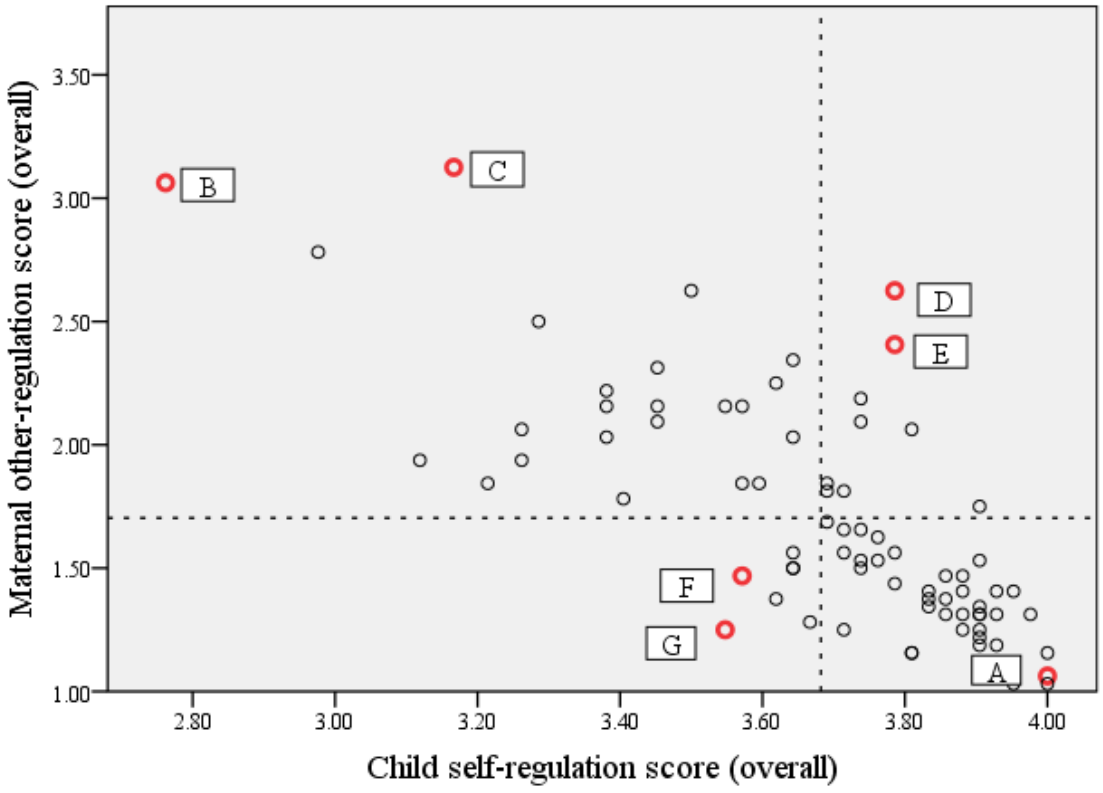
Correlations between child self-regulation and maternal other-regulation.

To look at the relation between the mother and child scores, we correlated the overall CSR and MOR constructs with bias-corrected bootstrapping to 1,000 cases. The relation between CSR and MOR was very strong, r = -.75, p<.001. Figure 5.3 demonstrates this strong correlation. In cases where the child showed high self-regulation during the task, mothers tended to show low other-regulation, and vice versa, fitting with the qualitative descriptions of original scaffolding observations (Wood et al., 1976). Correlations between equivalent mother and child scores on the individual behaviours and trial by trial were also calculated (see Table 5.2). The stronger negative correlations show more of a pattern of opposite scoring, i.e. high CSR and low MOR. Planning, attention and evaluation followed this pattern most strongly; with these behaviours, if the child was

scoring high, the mother was scoring low and vice versa. The other behaviours did not follow this pattern as strongly. Trial 3 showed the highest discrepancy in MOR and CSR, but the correlations declined over the following four trials, suggesting that there were less high-score and low-score equivalents as the task got harder. Part 2 describes a more micro-level analysis which picks up more sensitive information about this scaffolding interaction.

Figure 5.3

Scatterplot of overall child self-regulation and maternal other-regulation scores



Note: means of both scores displayed

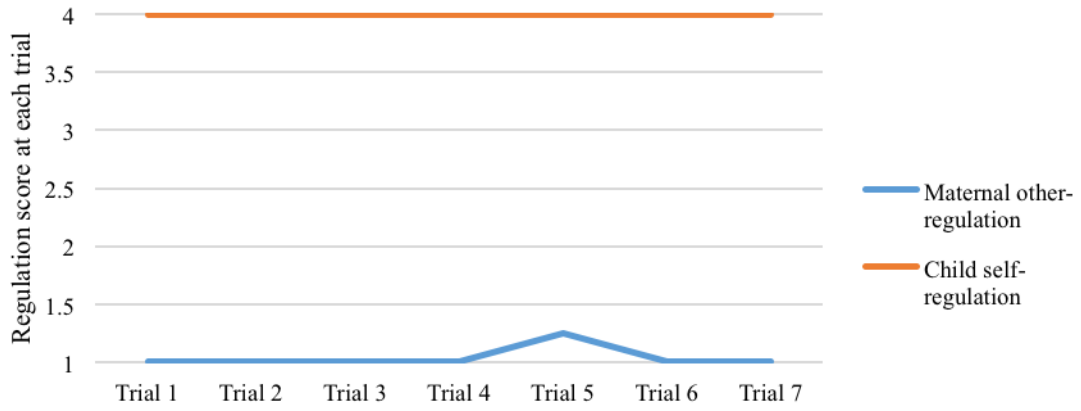
Part Two: Detailed Descriptive Analysis of Cases within the Sample

Having produced sample-level, general findings, we used the rich data to look in finer detail at the particular aspects of scaffolding we were interested in. For the second part of this study, we selected cases from the sample to examine variance within the interactions between families, creating graphs showing the dynamic processes through the course of the task and charts of the specific regulation behaviours involved for each family. As the correlation between overall MOR and CSR was so strong, we selected families fitting this trend at either end of the spectrum, and families who did not, so we could investigate how they varied from each other. In addition, in most cases we took two families for each end of the scale, to also look for variations existing *within* the extremes. These families have been labelled in the scatterplot in Figure 5.3.

High child self-regulation, low maternal other-regulation. *Family A:* The scatterplot (Fig. 5.3) showed that this family's configuration was highly typical of the families' interaction during the task. It is clear from the time chart for this family (Fig. 5.4) that the child was fully self-regulated at every trial, and even during the more difficult trials, and the mother's other-regulation was minimal. The ceiling effects seen here were seen in all the families in this category. This family, then, can be used as a basis from which to interpret the following families in other categories whose patterns varied from this.

Figure 5.4

Family A overall regulation over the course of the task



Low child self-regulation, high maternal other-regulation. *Family B (high complementarity):* In the time graph (Fig. 5.5), this child's self-regulation rates across the trials was highly variable, rising and falling over the course of the task. The levels of maternal support appear to complement the child's regulation during difficult trials; the mother delivers support at each trial that is *contingent* on the child's self-regulation levels. The child did not increase in self-regulation overall, and by the final trials self-regulated very little; this suggests the child was not mastering this task by the final trials, or stopped engaging in the task. The bar chart (Fig. 5.6) shows that the child struggled in planning and evaluation specifically; fittingly, the MOR behaviours in these two areas were notably high.

Figure 5.5

Family B overall regulation over the course of the task

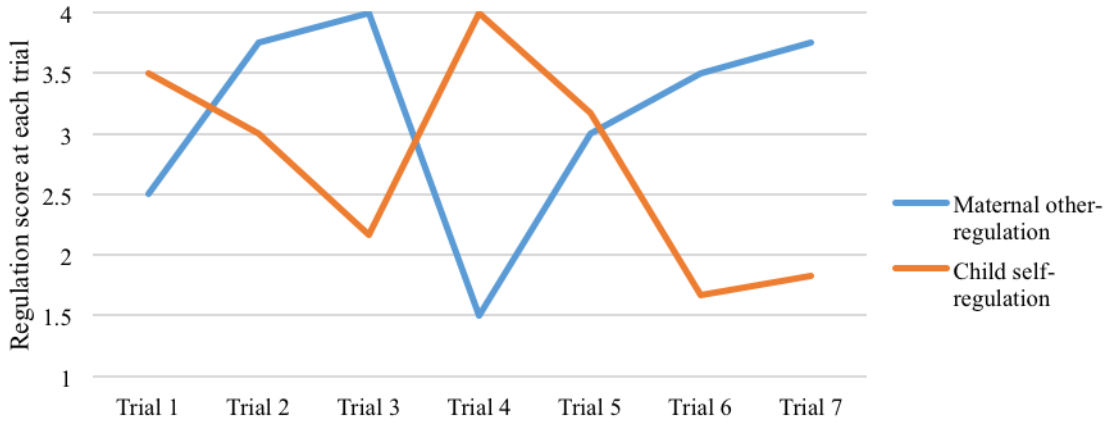
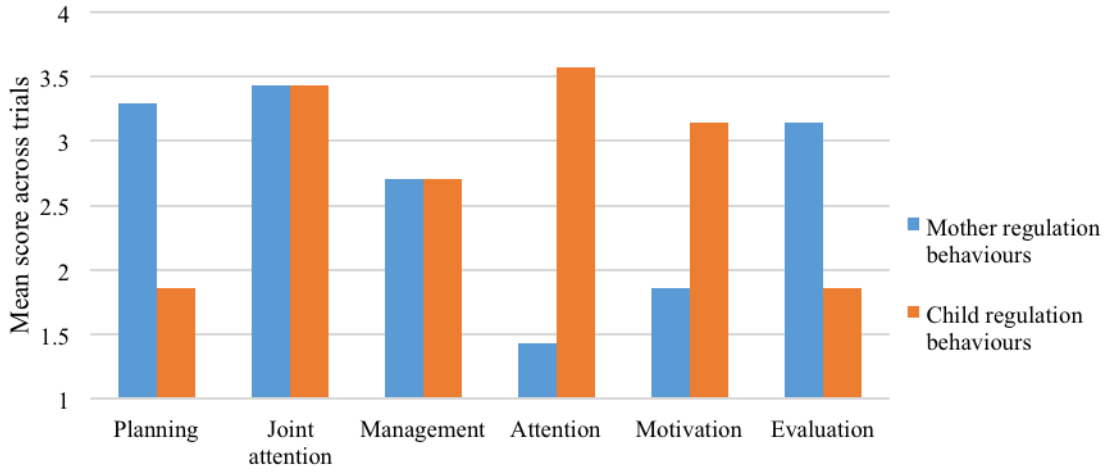


Figure 5.6

Family B mean maternal and child regulation behaviour types



Family C (low complementarity): This mother's overall MOR was a similar level to Family B, but in the time graph (Fig. 5.7), the dynamic over the course of the task is somewhat different. The child had developed good CSR skills in the first half, and applied them effectively for the second half (displaying mastery), but from trial 5 the mother kept delivering high-level MOR, with overall trial scores of 3 and above. This mother was not calibrating the level of support in light of changes in the child's capabilities like Family B; there is no transfer of responsibility from mother to child. The behaviours graph (Fig. 5.8) shows that the mother provided more other-regulation in the behaviours that the child struggled with. It seems that while the content of her other-regulation was appropriate, she delivered more of it than appeared necessary by the final few trials.

Figure 5.7

Family C overall regulation over the course of the task

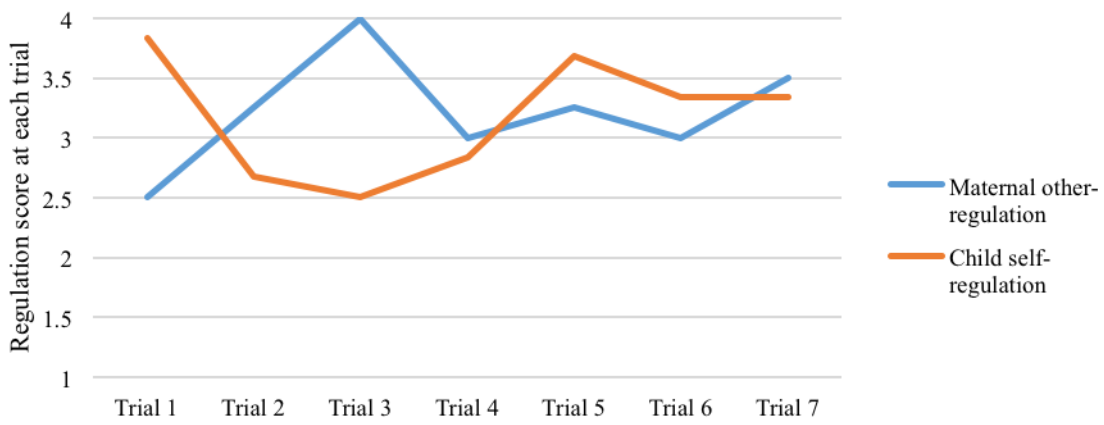
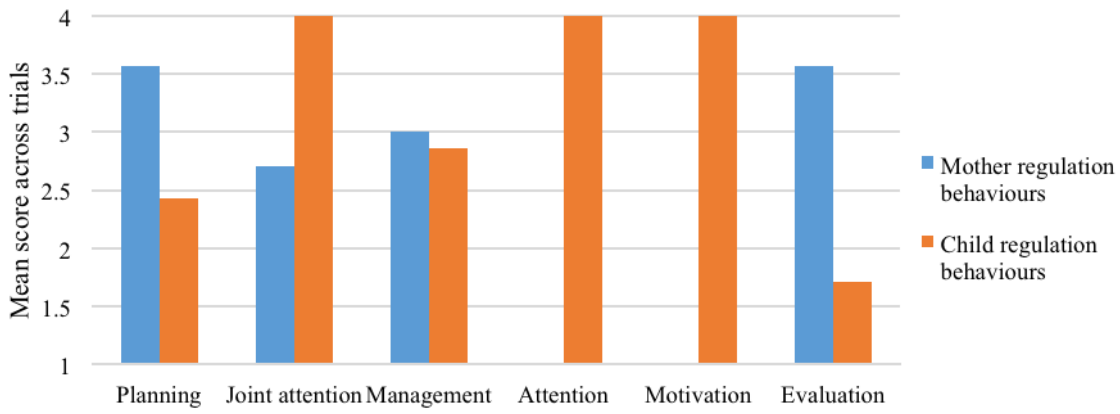


Figure 5.8

Family C mean maternal and child regulation behaviour types



High child self-regulation, high maternal other-regulation. *Family D (high complementarity):* The time graph (Fig. 5.9) shows a pattern comparable with the initial base-level Family A. CSR stayed high for each trial; and while the MOR may be comparably higher to that of Family A, it is a relatively consistent score, parallel to the child's. The regulation behaviour breakdown chart (Fig. 5.10) shows that the mother other-regulated the same behaviours the child did less well in; so while the other-regulation level was more than necessary, it was calibrated to the child's weaker skills.

Figure 5.9

Family D overall regulation over the course of the task

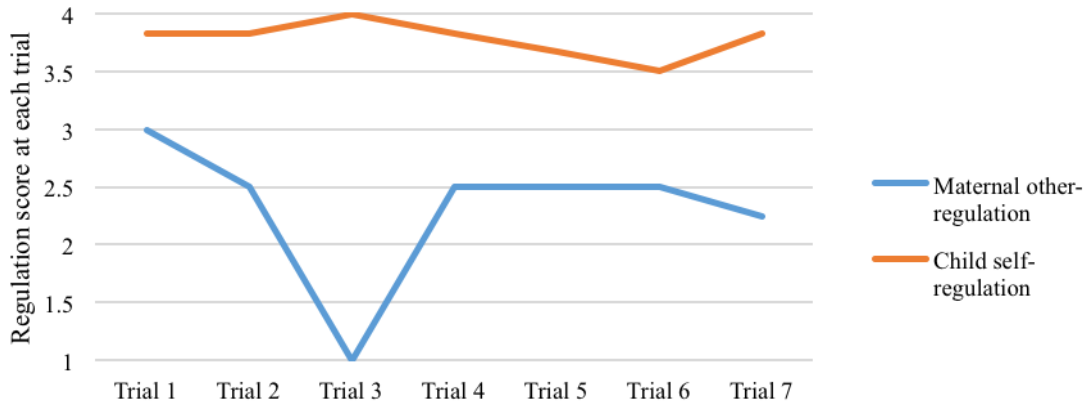
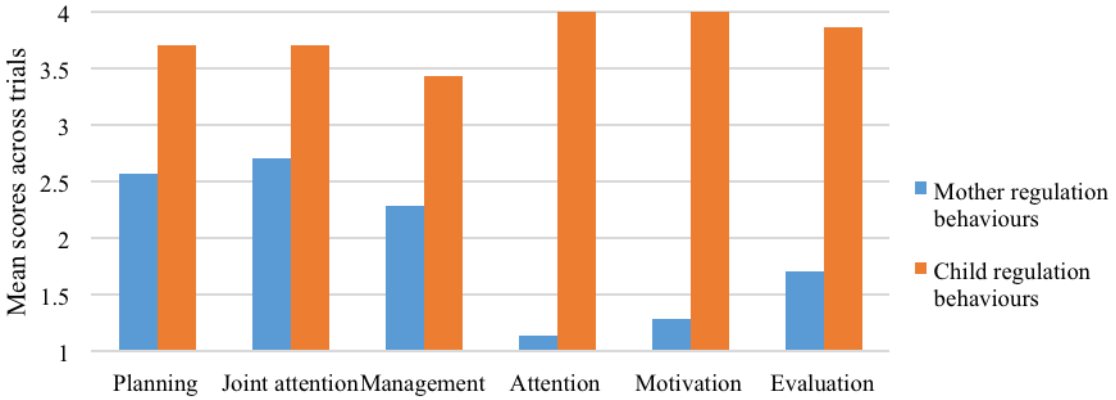


Figure 5.10

Family D mean maternal and child regulation behaviour types



Family E (low complementarity): The time chart (Fig. 5.11) shows that this child's self-regulation stayed high throughout the task; however, unlike Family D, the MOR levels varied over the trials, up to a score of 3.5, and did not follow the *fading* principle of generally decreasing in line with the child's capabilities. A slight drop in CSR after trial 4 corresponded to a substantial jump in MOR. The behaviours chart (Fig. 5.12) shows that the two other-regulating behaviours the mother scored highest in were

planning and management, neither of which the child scored particularly low in. This pattern of behaviour implies *over*-regulating behaviour from the mother.

Figure 5.11

Family E overall regulation over the course of the task

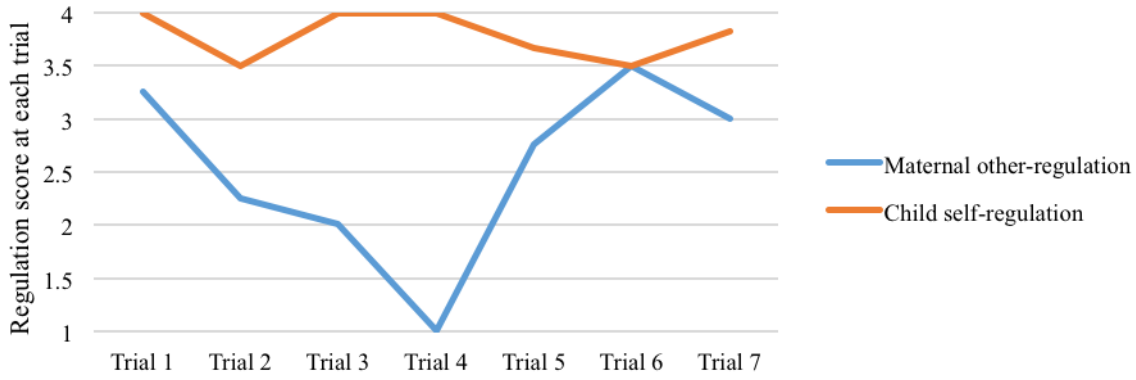
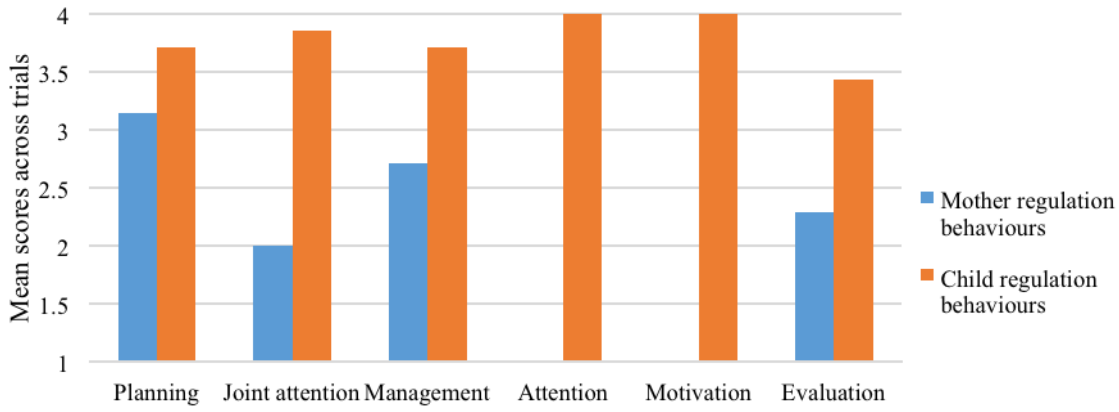


Figure 5.12

Family E mean maternal and child regulation behaviour types



Low child self-regulation, low maternal other-regulation. In our data set, it was rare for the dyad to have low overall scores for both CSR and MOR, mainly due to the exclusion criterion that the dyad had to finish all seven trials. *Family F (high complementarity):* The time graph for this family (Fig. 5.13) shows a complementary pattern of CSR and MOR. The mother's regulation is minimal while the child's is high, and for the last two trials, the child's regulation drops and, accordingly, the mother moderately increases her other-regulation. In the behaviours chart (Fig. 5.14), we observe some incongruity; while the child struggled most in planning, motivation and evaluation, the mother's other-regulated evaluation was low. It appears that while her increasing support was timely, she increased support in some, but not all, of her child's weaker self-regulation behaviours.

Figure 5.13

Family F overall regulation over the course of the task

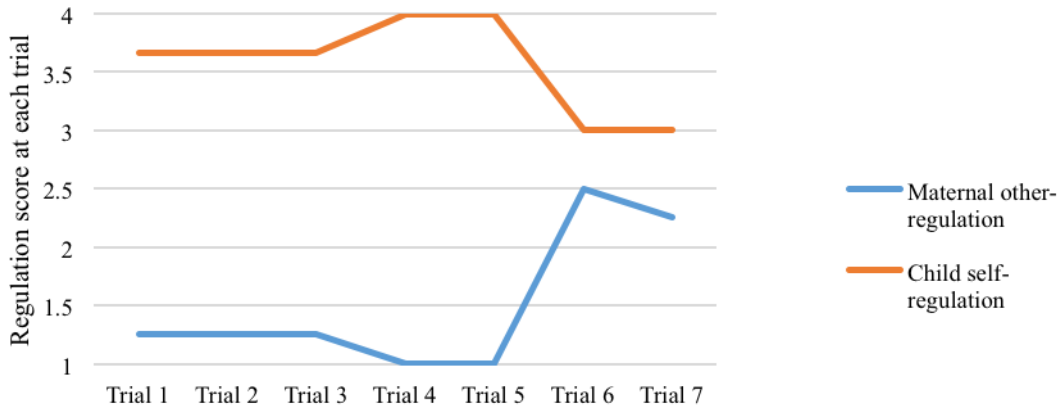
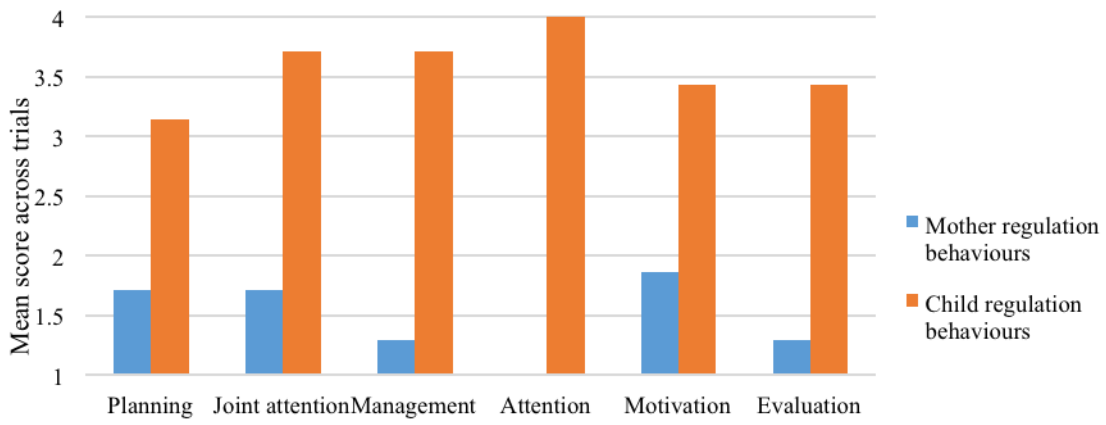


Figure 5.14

Family F mean maternal and child regulation behaviour types



Family G (low complementarity): We see in the time chart (Fig. 5.15) that from trial 5 onwards, the CSR decreased to a low overall score, showing the child does not master the task. Meanwhile, the MOR increased minimally over these final trials. The magnitude of change is notable; her response to a decline in CSR was markedly muted compared to other exemplar families. This might be interpreted as *under*-regulation (compared with Family E, who showed over-regulation); she did not build up more structure around the child when needed, as *contingency* rules suggest. For this family, the behaviour chart (Fig. 5.16) only features the behaviours of the final three trials, to increase sensitivity for the detail in these trials. The slight raise in MOR was in planning and evaluation, which were the CSR behaviours that the child is having least difficulty with. Instead, attention and motivation, which the child scored lowest on, was not other-regulated at all in these final trials. While the mother's increase in other-regulation is timely, it is small compared to the child's decrease, and she does not intervene in the self-regulation behaviours the child finds most challenging.

This coding scheme revealed some interesting comparative and contrasting interactions. By looking at both change across the task and differences between behaviours, we can observe diverse tutoring styles. Some contradict the scaffolding principles of *fading* and of *contingent shifting*, while others do not follow the transfer of regulation pattern to reach mastery at the end.

Figure 5.15

Family G overall regulation over the course of the task

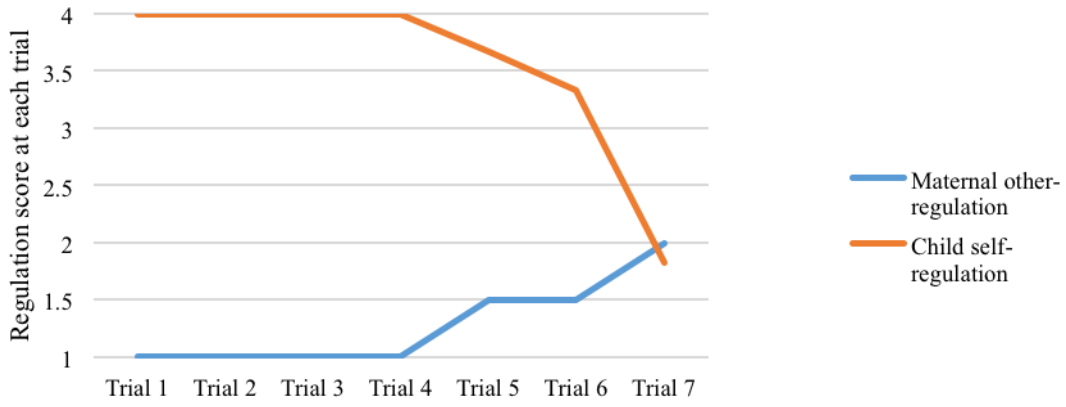
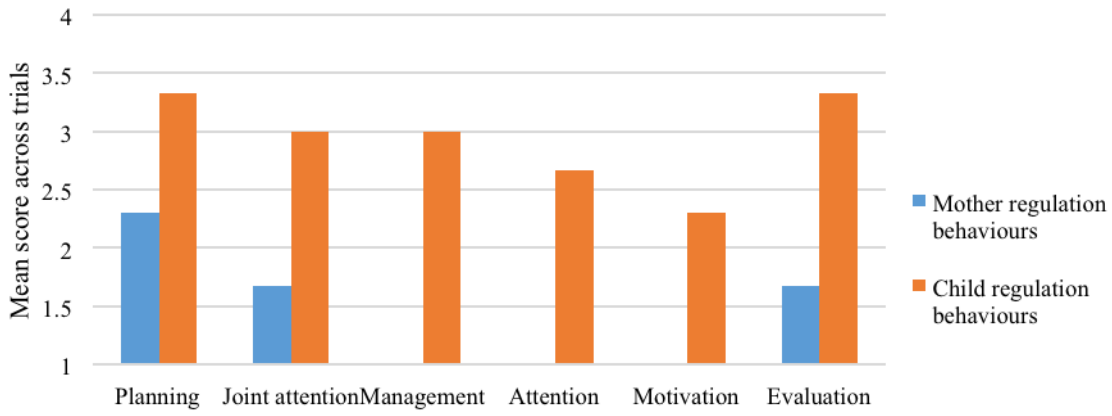


Figure 5.16

Family G mean maternal and child regulation behaviour types (note: only data from trials 5-7 featured in chart)



Discussion

In this study, we used a new method to code details of scaffolding interactions. Revisiting the original descriptive style of early observations that went on to inform scaffolding theory and measurement, this coding scheme focused on processes of transfer of regulation and of other-regulating, and captured the dynamic of mother and child in three dimensions: what they did, when they did it and how much they did it.

Nader-Grosbois and colleagues' original coding scheme has been used primarily to compare overall child self-regulation between groups. We recreated their sample-level trends of self-regulation over the course of a task (Nader-Grosbois et al., 2008), and correlated these against parents' overall other-regulation (introduced in Nader-Grosbois & Lefèvre, 2012) in Part 1. However, we have taken this coding scheme further, by looking at individual dyads' variation in both of the measurable dimensions (regulation behaviours, and development during the task). This adds a richness and complexity to existing self-regulation coding schemes, and allows for a highly detailed and qualitative assessment of a particular dyad's experience in a given task. The detailed coding enabled us to produce time graphs, and behaviour charts, of individual families, and we found the families are vastly different from each other, even those who scored similarly on global scores; more notable is how different they all are to the sample-level graphs from Part 1. By triangulating the time graphs and bar charts of each individual dyad with the sample-level overall patterns, we created distinctive and sensitive reports of each dyad's own interaction style.

The strategies of scaffolding (*contingency*, *fading*, and *transfer of responsibility*) are designed to aid the child in improving their self-regulatory skills, so that the child moves through the ZPD, and ends up mastering the task. Even dyads who scored relatively similarly in overall CSR and MOR showed substantial variations in the ways

in which this goal was, or was not, achieved. Some children did not show mastery of the task by trial 7, and so their ZPD was large; others were fully independent throughout the task, and were not particularly learning from one trial to the next. While there were particular behaviours that children tended to struggle to self-regulate, there was variation here also. Mothers varied in the timeliness and complementarity of their support; some did not follow the *transfer of responsibility* and *fading* rules and were either over- or under-regulating, while others delivered support at uncoordinated points and were not *contingent* in their levels of support. Some mothers provided more support to their child's less well-regulated behaviours, others in aspects of the task that the child was managing well. This information could go on to plot the longer-term effects of these different styles on children's learning progress and self-regulated learning skills.

Implications

Scaffolding coding methods. Part 1 of the results seemed to fit with the shape of most scaffolding coding schemes; the mother's input is calibrated to the child's, in line with ideas of contingency and fading. The scatterplot also fitted with scaffolding concepts. However, by Part 2 family-level variations showed that the sample-level scores provide only so much information. Two similar overall scores do not necessarily equate to similar displays of CSR and MOR behaviours over the course of the task. This challenges the use of overall scores in scaffolding research. This scheme plots the progress of the child as well as the quality of maternal support; some dyads displayed both appropriate scaffolding and a lack of mastery at the end. This demonstrates that scaffolding quality will not always result in independent management, at least in a task that gets progressively challenging. Instead, the child's capacity, engagement, and willingness to internalise and apply the other-regulated skills may be a very important factor in scaffolding success (as suggested by Tharp & Gallimore, 1998); but without

the level of detail provided by a coding scheme such as the one used here, this cannot be examined. Furthermore, with information about particular regulation behaviours, we can establish not just whether the child is struggling, but *what* they have difficulty with. Consequently, we can also see which demands of the task the mother involves herself more in, and whether this meets the particular needs of the child. Finally, by plotting regulatory rises and falls of both mother and child from trial to trial, we get a sense of their own dynamic: the bidirectional nature of their journey through the task, which is obscured in global, generalised group-level scores. Thus, there are multiple implications for future scaffolding research to adopt more detailed coding.

Task analysis. This coding scheme emphasises the importance of task analysis for scaffolding research. Our data can make general comments about features of Wechsler's 1974 block design task, which may be distinct to other tasks set for mothers and children; this task got steadily harder in the second half, challenging children most in their planning and in their management self-regulation. The fact that it was incremental, and was comprised of small, short tasks (which varied in length), meant it lent itself to episodic analysis. As this task is an intelligence measure, from one trial to another we may be witnessing points where children reach the limit of their self-regulation capabilities (following ideas of dynamic assessment of ZPD: e.g., Lidz, 1991). The style and qualities of tasks provided by researchers vary widely in these features listed above, and in others too (for an overview of the variety of tasks, see Nader-Grosbois, Normandeau, Ricard-Cossette, & Quintal, 2008). The general trends reported in Part 1 of the results would be markedly incomparable for another task, because the specific cognitive requirements of a given task may demand different levels of different regulatory behaviours at different points. Also, the patterns of the dyads' interactions in Part 2 would be different; some may have shown more mastery,

struggled in different self-regulation behaviours, and shown better or worse contingency and fading of the mother's support and on matched or mismatched other-regulation behaviours. Thus, it is important to understand the particular demands a given task places on dyads in general, and even on each dyad specifically; "in… different play or learning contexts, children may benefit from different forms of scaffolding from the adult and display varying degrees of self-regulation" (Nader-Grosbois et al., 2008, p. 107). This is also demonstrated by the high number of children in this study who reached ceiling effects of self-regulation (e.g., Family A). It is not feasible to assess a child's progression through the ZPD if the task is within their capabilities. By extension, we can make no assessments of scaffolding quality of the parent if the child does not need help. In parallel, trial 7 in this task may have been beyond some children's ZPD; we cannot ascertain whether their drops in self-regulation towards the end of the task are due to disinterest and a lack of desire to push themselves to the edge of their ZPD, or to enormous effort to complete a task that was beyond their ZPD. For researchers to generalise about scaffolding, the task level would ideally be set according to individual differences. In some tasks measuring child self-regulation, a task sensitive to the child's ZPD has been applied (e.g. Bryce & Whitebread, 2012); to our knowledge, however, this is rarely used in dyadic interaction research to assess scaffolding quality.

Limitations

There were notable limitations with this way of coding scaffolding, which should be considered when using such a scheme. First, it is informed by a micro level of analysis, but it cannot capture sequential behaviour between mother and child. The transactional account of dyadic interactions (Sameroff & Chandler, 1975; Sameroff & Mackenzie, 2003; Sameroff, 2009, 2010) describes an interaction as a series of responses by both members, whereby every action by one member is a reaction to the

other member's preceding action, and from this position the dyad should be seen as a whole entity. This coding scheme did not provide a dyad-level unit of measurement. The transactional account sheds light on a limitation of non-sequential data, which is that we cannot ascertain at any trial whether rises or falls of regulation are attributable to mother or child. The data this coding scheme provides, therefore, requires interpretation. In addition, although the coding scheme was sensitive in many ways, it only provided one score of each mother and child regulation behaviour type per trial of the Wechsler task. There was within-trial variation in MOR and CSR that was not accounted for. This then meant that all the trials were contributing to overall scores equally, even though the details of the final trial are likely to be more pertinent than those of trial 4. These are characteristics that should be considered when using a coding scheme such as this, and using a task with these features, in future research.

Concluding Remarks

This coding scheme is not a definitive way to observe and analyse data from large samples. As such, it is by no means a replacement of the scaffolding measures currently in use. However, by using a different sort of coding scheme for scaffolding coding, we have highlighted elements of the interaction which can often go unnoticed, and shed light on the qualitative differences between each mother and child in a given task: in terms of what they do, how much they do and when they do it.

Chapter 6:

General Discussion

The programme of research reported in this thesis focused on how children's experience of school and of learning is tied to maternal, home and dyad factors. Three of the papers reported in this thesis were a result of my small-scale longitudinal project on 5-7 year olds. The fourth used existing data from the Sisters and Brothers Study. We aimed to contribute to the literature surrounding contextual factors and how they relate to a child's learning experience, and to gain new insights into the conceptual and methodological frameworks of the social learning process. In the introduction I outlined some specific theoretical and methodological aims for the thesis; in this final chapter I return to these aims, and discuss how my programme of research has addressed them and extended the current knowledge. Following this, I reflect on the implications of the findings from this thesis, and outline some general limitations and potential avenues for future research in this topic.

Research summary

Reflections

I used the ‘overlapping spheres’ model borrowed from Epstein as a starting point to explore how home spills over into school and vice versa. Upon reflection on the overall thesis, however, this framework extended far beyond this, applying to various overlapping physical and psychological spaces. There was also the overlap of mother and child – two individuals who are linked by genetics and an intensive shared history – which featured heavily throughout these papers.

The model allowed us to define different characteristics of the ‘overlap’, beyond the original ‘home’ and ‘school’ contexts. Homework was used as a specific activity that fits into both school and home life. The space between mother and child was defined in multiple ways. It was the space of ‘transition’, where tutoring and learning takes place (especially in Papers 3 and 4). It was also a ‘transactional’ space, especially in Paper 2, which evidenced an exchange of affective experience between them both.

The thesis also explored different direction of influence from one sphere to another, through the shared space. Paper 1 looked at how home life may affect how the child understands himself or herself in a different context. Paper 2 turned the direction around, tested the influence of homework as influencing interaction styles at home. Similarly, the ‘tutoring’ space between mother and child was understood both unidirectionally (Paper 3) and bidirectionally (Paper 4).

Investigating something within an area of overlap is highly challenging within the constraints of scientific enquiry. I used measures in this thesis to disentangle the behavioural-genetic overlaps from the environmental ones (specifically, repeated-measures and longitudinal designs for mother and child interactions), innovative and varied methods to code the 'learning' and 'tutoring' overlap between mother and child, and trialled ecologically-valid activities to capture genuine behaviour.

Altogether, this thesis provides further evidence that a substantial, and important overlap exists between the worlds of school and home, affecting the child in many ways; and to understand a child's experience of school, it is crucial to have insight into their home life. It suggests that home life (generally, and specifically in mother-child interactions) and school life and work influence each other strongly in both directions and in micro- and macro-levels. Cooper's claim that "… homework probably involves the complex interaction of more influences than any other instructional device" (Cooper, 1989, p. 87) certainly stands. The homework a child brings back to school has been completed under conditions that influence the experience: the mother's beliefs about education and about her child, the emotional exchange, the quality of the support have all had a bearing on that homework. This thesis serves as a prompt to review the idea that homework has a 'blanket' value for all children, and reflect on whether existing policies on homework are appropriate across the board.

Substantive Contributions *(Aims 1 – 4)*

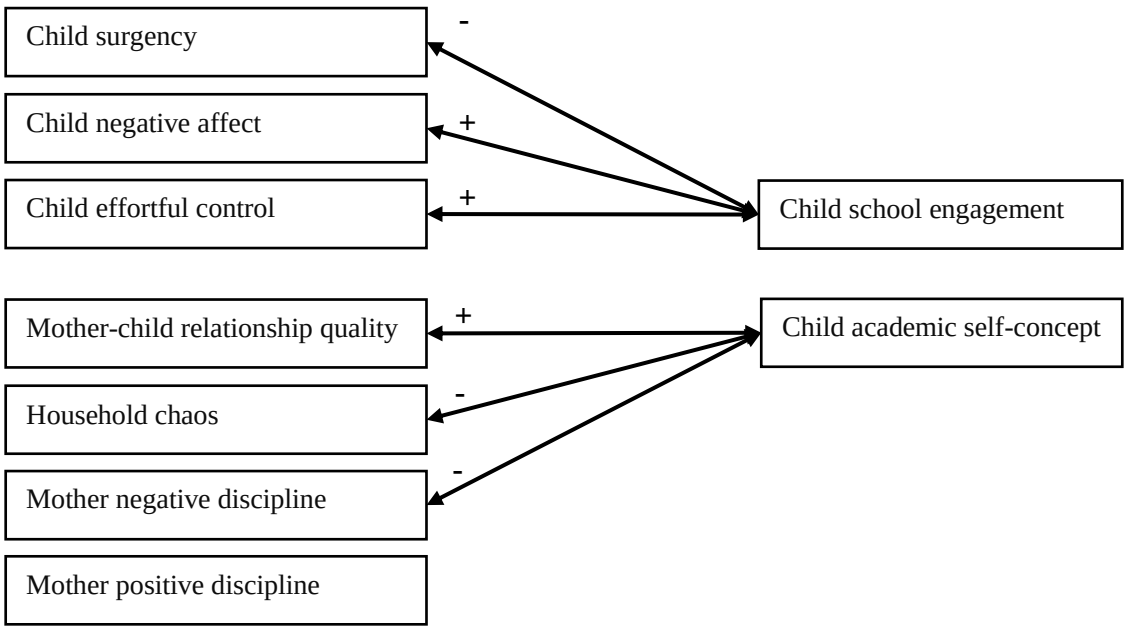
A core theme of this thesis was the 'overlapping spheres' of home and school and how they play out in child development. As such, experiences of school and of schoolwork featured in the first three papers, and behaviour at home was measured. While much of the research into child development investigates associations between the child and distinct components of Bronfenbrenner's microsystem, I focused distinctly

on maternal, child and family associations with the space *between* the microsystems of home and school. The two aspects I concentrated on were the child's self-reported school engagement (Paper 1) and the homework the child had been set (Papers 2 and 3). These (especially homework) are spaces where home and school meet; a microsystem 'no man's land'.

Paper 1's findings suggested that unlike children's emotional and behavioural engagement in school, maternal reports of the climate at home were associated with academic competence beliefs; children experiencing more structure, less inconsistent discipline and a better mother-child relationship had a better academic self-concept (see Fig. 6.1). It appears, then, that aspects of children's home life may spill over into children's beliefs about themselves in contexts outside of home.

Figure 6.1

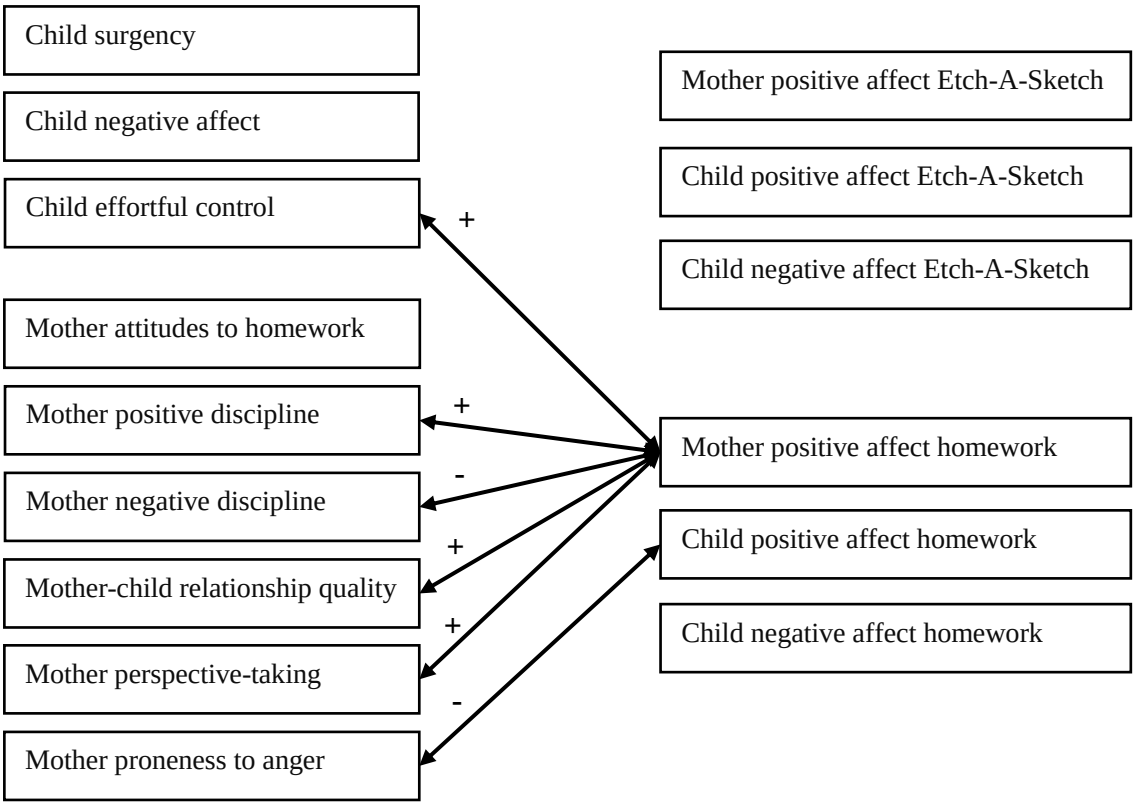
Visualisation of significant correlations in Paper 1



Homework is a concrete example of where home and school meet head-on; Papers 2 and 3 investigated how family factors may play a role in this overlap. Paper 2 compared the emotional displays of mother and child during homework to those during a non-homework task. Maternal positive affect during homework was associated with many factors: her child's temperament, her perspective-taking, her attitudes towards homework, and aspects of her parenting and their relationship. Child positivity during homework correlated only with the mother's proneness to anger. These factors didn't correlate in the non-homework affect. Thus, it appears that the pleasure and enjoyment displayed *during homework*, especially affect displayed by the mother, is linked to distinctive characteristics of the two individuals and of the dyad.

Figure 6.2

Visualisation of significant correlations in Paper 2

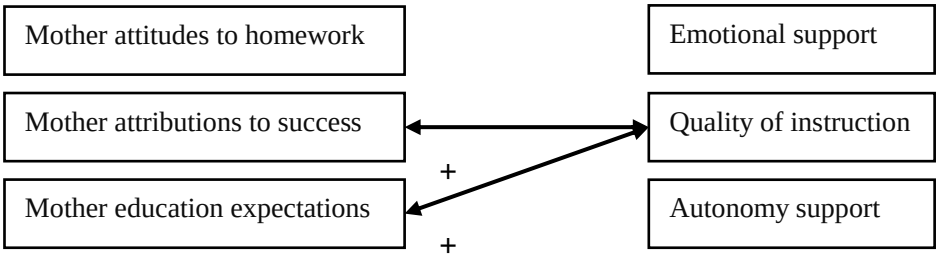


Paper 3 took this further, by investigating whether a mother's attitudes about education, rather than her personality specifically, have a bearing on the effectiveness of her tutoring support during homework. Controlling for scaffolding during non-homework at the earlier time-point, aspects of maternal scaffolding quality at the second visit (especially the quality of her instruction) related to the mothers' prior attributions for school success and her education expectations for her child. Unlike Paper 2, attitudes to homework were not predictive of maternal behaviour during later homework; however, other beliefs held by the mother were. This suggests that maternal beliefs have a particular role to play in the mother's delivery (of positivity and cognitive support)

during homework. In sum, both homework and child school adjustment in Key Stage 1 demonstrate home-school overlap, intertwined with multiple factors of child and especially of mother.

Figure 6.3

Visualisations of significant regressions in Paper 3



Interaction theories such as Sameroff's transaction model and Belsky's family process model acknowledge that characteristics of mother and child impact on the style of the dynamic between them in any given interaction. The interaction between a mother and a child can be looked at from many vantage points. In the thesis, I used multiple perspectives across the papers, to create a fuller picture. Mother and child affect during a joint task is indicative of the emotional experience when working together. As Paper 2 found that observed affect is associated with multiple factors, it would seem that affective expression can be a useful window through which to view mechanisms of the joint interaction experience; similarly, as maternal and child positivity correlated highly within tasks, bidirectional reciprocity is evident.

The tutoring experience is inherently one of socio-cognitive development. Papers 3 and 4 addressed the more cognitive side of maternal tutoring, viewed through two complementary lenses: scaffolding (Paper 3) and transition of regulation (Paper 4). While Paper 3 observed the mother's behaviour only, the final paper incorporated the child's behaviour too, to return to the more bidirectional understanding of a mother-child interaction that Paper 2 touched upon.

According to Epstein (1992), both mothers and children are responsible for the pulling together of home and school. In Paper 1, which focused on child school adjustment, I observed a substantial split between child temperament and home life factors; the mothers and children demonstrated differentiated links to this aspect of child's school experience. In Paper 2, however, the focus was on homework rather than school adjustment, and we see substantial and multiple associations between mother's personality and child temperament factors, as well as dyad characteristics. Individual, dyadic and contextual factors all appear to play differing and complex roles in the aspects of a child's learning and school experiences I measured in these studies.

Methodological Contributions *(Aims 5 – 7)*

Paper 4 was an opportunity to return to more micro-level tutor-child interaction observations. Drawing on the transactional model (Sameroff & Chandler, 1975) and the transition of regulation account (Wertsch, 1979) of the tutoring process, I adapted an existing coding scheme for self- and other-regulation scores that were coded multiple times throughout a task the mother and child completed together. This coding scheme was an attempt to bridge the more global measures of maternal scaffolding and the fine-grained micro-developmental observation tools of mother and child bidirectional processes, and provided a new vantage point to evaluate the existing coding strategies for this area. The scheme provided highly detailed accounts of the exchange of

regulatory effort (or lack thereof) per dyad. In pulling out exemplar families, we saw that the micro-developmental trajectories varied widely from the average trajectory of the entire sample, and families who had similar general scores had very contrasting tutoring and regulating processes. This coding scheme also enables us to ascertain whether mastery was reached by the child by the end of the task.

The existing methods to measure maternal scaffolding are very varied, in terms of the specificity of behaviour categories, the types of ratings and scales, and data reduction decisions. However, little attention is paid to what constitutes *inappropriate* scaffolding behaviour, and existing coding schemes tend not to differentiate between over- and under-scaffolding practices. As Paper 3 had two interactions (one homework, one non-homework), I used this opportunity to devise a scaffolding coding scheme that incorporated both *extent* of support, and *appropriateness* of support, in the same scale. This 'Goldilocks' scheme enabled me to identify when minimal support was appropriate, according to the child's current progress, and when minimal support was too little. Similarly, high levels of support could be categorised as appropriate or as intrusive, depending on the child's management of the task and requests for help immediately preceding the mother's supportive (or unsupportive) behaviour. Each mother in Paper 3 had a score on *over-support* and *under-support*, to compare to her later scaffolding during homework, which was coded using a more traditional scaffolding scheme. This Goldilocks measure of scaffolding was sensitive to the state of the child's own effort and success through the task, and acknowledged the importance of rating the appropriateness of the mother's behaviour in light of the child's.

Homework has received a lot of research attention. In literature searches, however, it is notable how rarely genuine homework has been used as a tool for observing natural behaviour during homework. Papers 2 and 3 addressed this, by using

genuine homework rather than the proxy alternatives often employed in empirical studies. Paper 2 tested the value for homework research of observing genuine homework interactions by comparing affect during these interactions with affect during a task more typical of those provided by researchers for interaction studies. The differences in affective displays, both within individuals (especially the mother) and across tasks, as well as differences in correlates of these affect scores, confirmed that there is substantial value in using genuine homework tasks for homework research, rather than homework-like tasks set by the researcher. Homework's specific associations with school and the classroom may give rise to specific behaviours during homework interactions that an alternative task may not detect.

Paper 3 applied the guidelines set out by Paper 2, using genuine homework and controlling for a non-homework task. There were many logistical difficulties with using genuine homework, including (but certainly not limited to) differences in difficulty and subject matter from family to family. By extension, the delivery of support by the mothers may have had different demands and been under different pressures. However, these would not be entirely avoidable when using a proxy task. To standardise a task in order to overcome these problems would then mean returning to proxy, non-genuine homework interactions, which Paper 2 had confirmed was a potential methodological problem in this field of research. In this area of research, there is a balance to be struck between task control and task authenticity.

Implications of this research

Theoretical Implications

Epstein's 'overlapping spheres of influence'. In the first three papers of this thesis, I have focused on homework as a tangible aspect within the 'overlap' of home and school. Qualities of the 'shared space' where home and school meet (or indeed,

collide) is considered by Epstein to be critical for healthy child development. A positive and productive homework experience could be understood as an example of a positive and strong home-school partnership. According to Epstein, children, mothers and teachers can all force these two worlds together or further apart. Applying this to my findings in Papers 2 and 3, aspects of a homework interaction at this age that may make the experience more beneficial rest primarily with the mother; the features in the children that I measured had little bearing. It may be that other characteristics of the child that I did not measure may affect their experience of homework with their mother. It may also be that children contribute to other aspects of the home-school partnership, bringing these two worlds together; Epstein's (1992) example is the child can tell their parents about feedback from the class teacher, which I did not measure.

A pleasant and cognitively stimulating homework interaction is potentially highly valuable in keeping the overlap between home and school robust and positive. One implication of these findings is that it provides a further understanding of the individual aspects of a mother that may motivate her to create more of an overlap in the homework context, and help the child enjoy and learn more from school-set work in the home.

Belsky's Family Process model. According to Belsky, aspects of the child, the mother, and the social context all influence the quality of the interactions between them. Belsky proposed that mothers with a 'healthy' personality give rise to better parenting (Belsky & Barends, 2002); my results from Paper 2 align to this position. However, the child temperament measures, which Belsky emphasised were highly influential in parenting, had little association with maternal displays of positive affect. Furthermore, the correlates I *did* find were only evident during the homework task, whereas the Etch-A-Sketch task, completed during the same visit, yielded no associations. It is an

unexpected finding, and I hypothesise that this may be due to differences in the *nature* of the two tasks. It might be the case that at this age, the associations that come attached with homework make it more intertwined with individual and dyadic factors; in a sense, homework interactions have fewer buffers against the negative consequences of maternal personality factors than a novel joint problem-solving task. An implication of this is that Belsky's model could consider context when assessing parent-child interaction quality, as emerging patterns may have different levels of importance in different contexts and under different conditions.

Sameroff's transactional account of interactions. Papers 2 and 4 were influenced by transactional notions of bidirectionality, especially the final paper. Paper 2 demonstrated emotional reciprocity during both homework and non-homework tasks; the positive affect between mother and child correlated very highly, implying a bidirectional interchange. Given the strength of these correlations, it is notable that maternal and child factors related to the mother's positive affect *but not the child's*. An interpretation of this through the transaction perspective is that for homework during the early school years, it is the mother who leads in setting the emotional climate within the interaction, and the child's affect is guided by the mother's (and potentially by other factors that were not measured).

The socio-cognitive theories: Vygotsky, Wertsch and Wood. Vygotsky's socio-cognitive account, Wertsch's transition of regulation account and Wood, Bruner and Ross' scaffolding metaphor all describe the process of learning with a tutor's help. In many ways they overlap, and in other ways they complement each other. Paper 4 was an initiative towards drawing together these three theories, to reach an integrated framework. This framework was operationalised with a coding scheme designed to address the areas that one or more of these theories does not accommodate. First, it

acknowledges the child's contribution to the task (unlike Vygotskian and scaffolding concepts). Second, it identifies the specific learning and tutoring skills taking place, which were not featured in Vygotsky's or Wertsch's work. Thirdly, it plots and emphasises within-interaction changes in quality of the cognitive interchange, whereas scaffolding often condenses and reduces these changes down. Furthermore, when coupled with the Wechsler task, this coding scheme allows for a ZPD that varies from child to child, and can distinguish between completion and mastery at the end of the task. In this way, the coding scheme highlighted the gaps currently existing in each theory, which could be used to inform and refine future coding schemes for mother-child pedagogic interactions.

Discussions about existing scaffolding schemes during video coding led to the development of the Goldilocks coding scheme, used in Paper 3. This coding scheme added extra detail to the under-defined and under-emphasised *sub-optimal* scaffolding concept; the more nuanced picture of over- and under-support revealed interesting predictions for scaffolding during homework a year later. This extra perspective may lend itself to being incorporated into the overall theoretical vision of scaffolding, by shedding light on what behaviours constitute *non*-scaffolded interactions. The well-cited and often used concept of scaffolding has a highly defined idea of what appropriate scaffolding is – and my scheme offered insight into differentiated styles of *inappropriate* scaffolding.

Practical Implications

This thesis looked at family and home characteristics from an educational slant, and found results specific to Year 1 children's school adjustment and home life. The findings most relevant to families were that factors of home life (chaos, maternal discipline behaviour), and of the child's relationship with the mother, related to aspects

of the home-school overlap; specifically, children's beliefs about their own academic competence (regardless of their *actual* competence) and the emotional climate during homework in Year 1. The mother's own personality and beliefs also played a role in the style of homework interactions. Her perspective-taking and proneness to anger were found to relate to the positive affect displayed during mother-child homework tasks, and to her beliefs about the role of home life in school success. Also, her beliefs about the role of the home in education predicted the cognitive support she provided during homework.

Our findings suggest that at this point in the child's school life, the mother may have substantial influences on important aspects of a child's school and learning experience and beliefs. There is reason to assume that a child with high academic self-beliefs, whose homework interactions are positive and well-scaffolded, stands a better chance of remaining engaged and motivated in school and in homework as these experiences accumulate over time.

General parenting programmes, implemented with children from disadvantaged backgrounds, have successful child outcomes (Lindsay & Cullen, 2010), including raised academic self-esteem (such as the Strengthening Families, Strengthening Communities Parenting Programme: see Wilding & Barton, 2009). However, even in the advantaged population my sample came from, particular areas of family life were variable, and were important for the quality of the home-school overlap. Further attention should be paid to the impact of chaos in non-disadvantaged populations as well as disadvantaged ones, as the association with academic self-concept suggests it is important for families to manage the chaos in the home in order to foster positive academic self-concepts in children, regardless of social advantage. Furthermore, Paper 2 flags up a need to acknowledge the effect that maternal anger may have on the

homework experience. Given the efforts made in developing and implementing interventions for mothers with depression in order to buffer the negative impact on their children (see Barlow, Coren, & Stewart-Brown, 2002 for review; e.g. Gelfand, Teti, Seiner, & Jameson, 1996), this thesis suggests that there is scope for maternal anger and its effects to be scrutinised in a similar way to maternal depression.

Paper 3 highlights a need for parental awareness of the potential influence of their own beliefs on their behaviour with their child. Homework is highly divisive, and many parents feel strongly either for or against it (Gill & Schlossman, 2004). Parents reported very different levels of communication from the school about the value of homework, and the role the mother plays. Indeed, the open-ended comments section at the end of the maternal questionnaire at Times 1 and 2 showed clear inconsistencies in experiences of homework guidance from schools across families. Paper 2 may be of interest to teachers and educationalists, as it demonstrates that when teachers send work home, the affective experience when completing it varies from child to child, and relates to multiple aspects of the mother and how she behaves towards the child. Also pertinent to teachers are the findings in Paper 3, whereby maternal beliefs about education can actually predict the quality of the support the child receives during homework. For schools to make the homework experience as beneficial as it is theorised to be, they may wish to consider putting in additional effort to promoting homework (perhaps by modelling positive attitudes and values) and addressing parental concerns. Health psychologists have successfully used the link between beliefs and behaviours to their advantage, targeting beliefs to help improve health behaviours (Frey et al., 2005). Applying this to my research, there may be some benefit in schools promoting particular beliefs to mothers; especially that the home environment plays a substantial role in their child's educational experience, that homework is beneficial for children's

learning, and to keep their expectations of their child's achievement high. This may result in 'self-fulfilling prophecy'. Educational research has found some evidence for self-fulfilling prophecies pattern with child educational outcomes (Jussim, Eccles, & Madon, 1996; Rist, 1970; Wineburg, 1987), but the focus is predominantly on the educational attitudes and expectations of the teacher, rather than the mother (Rubie-Davies, Peterson, Irving, Widdowson, & Dixon, 2010), with whom attitudes about gender are more commonly measured (e.g., Tiedemann, 2000). The potential self-fulfilling prophecies of maternal educational attitudes warrant further exploration.

This thesis is relevant to both national and school homework policy. I cannot make any overarching claims about whether the theorised ideas of the value of homework are evidenced in the findings outlined in these studies. What the findings can do is alert educationalists and policy-makers to the fact that homework may be more or less beneficial depending on the family. Some powerful and influential essays have stressed that homework widens the achievement gap for disadvantaged pupils (e.g., Kralovec & Buell, 2001), which is highly pertinent for policy-makers. The results from this thesis extend this further, suggesting that even dyad-level differences may contribute to whether homework 'works' in the areas it is believed to. Beyond ethnicity and social class, some children may be at an advantage due to their mothers' personality, attitudes and beliefs, and the mother-child relationship quality, which may help or hinder the desired outcomes of homework. Thus, it may be suitable for homework to be given to some pupils more often than others. Teachers may wish to use their knowledge of their pupils' families to inform them of who may benefit more from homework, and who may not feel those benefits, and set homework and deliver extra guidance accordingly.

Methodological Implications

Papers 2, 3 and 4 suggest reconsidering certain methodological practices. First, they contain persuasive evidence that genuine homework observations provide a unique insight into mother-child interactions. Paper 2 confirmed that affective displays are notably different during homework and during a non-homework task, and Paper 3 found correlations between contextual factors and scaffolding during homework, even when controlling for scaffolding in non-homework activities. The reality of using genuine homework in research is far from straightforward; the variation of type, subject matter and difficulty would be a methodological challenge for any empirical study. However, there is much to gain from reflecting on the homework research in light of these insights. Papers 2 and 3 suggest that, wherever possible, genuine homework is used to gain ecologically valid findings.

Second, the Goldilocks scaffolding scheme piloted in Paper 3 was a move towards developing a scheme that gives more detail about the nature of inappropriate scaffolding. Paper 3's results showed that the particular *kind* of inappropriate scaffolding predicted later homework scaffolding quality; and it may also predict other outcomes. Research has established that less optimal scaffolding has negative immediate and long-term outcomes for the child (Grolnick et al., 2002; Hokoda & Fincham, 1995; Neitzel & Stright, 2003; Stright et al., 2001), but disentangling the types of inappropriate scaffolding may reveal more differentiated associations. Wood (1999) hypothesised that over-scaffolding does not give the child enough space to develop; this particular claim could be empirically tested using a tool like the Goldilocks coding scheme. Developmental psychologists may wish to include measurement tools like the Goldilocks scheme to create a more nuanced profile of *what the adult does* that is not conducive to effective scaffolding.

Third, Paper 4's revisit to early concepts of the socio-cognitive tutoring experience enables us to reflect on and critique currently used methodological practices. It is a demonstration of a coding scheme that scrutinises the child as much as the adult, acknowledges change over time, and distinguishes between the relevant skills. With this in mind, interaction researchers may use this insight as a springboard from which to create scaffolding coding schemes with more inclusion of the child's own efforts, or turn to this style of scheme for uncovering multi-faceted self- and other-regulated learning processes in greater detail.

Limitations and Future Directions

The limitations of the studies presented in this thesis are outlined within the previous chapters. There are some over-arching limitations, which are detailed below, and suggestions are made for future avenues of research.

Sample size and generalisability

Through questionnaires, videos and interviews over two time-points, each family participating in the Homework Project provided a wealth of rich, dense data. However, this meant that the sample size was limited. Statistical power was a concern in analyses throughout this thesis, and was addressed by using stringent estimates of two-tailed tests and bootstrapped confidence intervals (du Prel et al., 2009). Larger sample sizes would also have enabled more detailed statistical modelling, such as mediation models and nested models. The homogeneity of the sample also limits any generalisations to a wider population; they were predominantly White and the mothers were highly educated, and both ethnicity and socio-economic status have been found to play a role in related research findings (Alexander et al., 1994; Halle et al., 1997; McLoyd, 1990; Watson, Kirby, Kelleher, & Bradley, 1996). The combined findings of this thesis paint a picture of White, middle-class south-east England, which has a

particular value in itself, especially given the significant findings yielded from the variation within this homogenous sample. They were all engaged in their children's homework, though they varied in their attitudes towards homework. A larger, better-resourced research programme would be well-equipped to explore this further, recruiting families from different ethnic, geographic and socio-economic backgrounds, and, most usefully, with different levels of involvement in their children's education and in homework. These initial findings suggest that there would be value in such an enterprise.

Multiple time-points

My small-scale longitudinal data study (the Homework Project) was limited to the first two years of mainstream school. Value would have been added if information was gathered prior to these school years, to ascertain whether, for example, home life *predicts* child academic self-concept. Data collection in the years following these targeted years would also add substantial value, not least in confirming whether these early self-concepts are stable[3], or whether less positive affect and less optimal scaffolding during homework interactions are predictive of less developed self-regulated learning, more disengagement with homework, and lower academic attainment in the future. These are all research questions which would be highly valuable as a focus for future research.

Bidirectional coding

Despite the richness of the data yielded from Paper 4, I was not able to ascertain the bidirectional quality of the interactions. Similarly, the affect in Paper 2 suggested

[3] The puppet interviews took place at both time points, and both school engagement and academic self-concept were found to be relatively stable over time, r=.49 for self-concept, and r=.31 for engagement. However, this finding was not reported in Paper 1.

reciprocity, but the transactional nature of affect this implies could not be investigated. As Sameroff explained, description is the most common outcome of bidirectional research (Sameroff & Mackenzie, 2003). This problem of interaction coding schemes permeates the whole research area of adult-child tutored interactions (D. Whitebread, personal communication, 24th September 2014); when we focus on the separate behaviours of the mother and the child at *any* given point in an interaction, we are discounting the behaviour of the other. I came across this in Paper 4, when the descriptive coding of the Wechsler interactions could not specify whether a low self-regulation score at any given point was a product of the child's own regulatory difficulties, or withdrawal due to the mother's increased involvement. According to Van Geert and Steenbeek, scaffolding requires a *coupled* dynamic model: "the level of the pupil will determine the level of the scaffold… while the level of the scaffold will determine the level of the pupil" (2005, p. 118). This is not easy to unpack without a coding scheme far more fine-grained and complex. I also addressed this problem in the development of the Goldilocks scaffolding in Paper 2, consciously coding for the appropriateness of the mother's support in light of the child's behaviour. However, this does not solve the problem fully. Future researchers using tutored interaction data may wish to use a *dyad*-level coding scheme, rather than scrutinise mother separately from child throughout. This alternative perspective may provide data that avoids these common pitfalls.

Multiple informants

For the papers reporting Homework Project data (Papers 1, 2 and 3), multiple sources of information were always used: child and mother reports in Paper 1, and mother reports and objective video observations for Papers 2 and 3. The benefit of this design is that not all the information comes from a single source. I am aware, however,

that many of the maternal reports are subject to social desirability biases. Using multiple informants for the same construct can be a highly effective way of bypassing this problem. I would recommend that larger future studies validate maternal reports by also extracting the same information from another family member (either the child or the father) in order to triangulate the construct. Given the themes around these papers, a teacher's perspective of child temperament may also provide an extension not just of the mother's perceptions of the child at home, but also the stability of temperament across the home and school spheres.

The role of fathers

To avoid further reducing power in an already small sample, this thesis investigated mothers only. This is because mothers are typically the primary caregiver, and are more involved in helping with homework than fathers (Chen & Stevenson, 1989; Levin et al., 1997; Lindberg et al., 2008), though this trend appears to be changing (see Hyde et al., 2006). Furthermore, fathers engage in their child's education in different ways to mothers (Solomon et al., 2002; Wingard & Forsberg, 2009), which may have confounded the data analysis. These differences between mothers' and fathers' roles may well have important implications for children's experiences of learning in the home including homework, as well as the development of their own scholastic confidence. Murray and colleagues (2006) found that fathers' behaviour during homework have less predictive value on child outcomes than mothers', suggesting that mothers may be the more relevant focus for homework research. However, there is scope for deeper examination of the father's role in learning at home, as research focusing on paternal educational beliefs, and father-child relationship quality may yield a contrasting set of statistical patterns to those that I found in this research programme. Optimal father parenting styles have been found to buffer against the deleterious effects of less optimal

maternal parenting (Simons & Conger, 2007); by extension, paternal factors may exacerbate or buffer the effect of mother and child characteristics on the personal and educational outcomes I explored in this thesis.

Conclusion

In conclusion, the studies within this thesis have contributed to our knowledge of development in a social context, stemming from both empirical and methodological motives, and using a range of research methods. The findings from these studies have shed light on particular factors about the mother and child that were found to play a part in school-related experiences for children: their beliefs about school, and the quality of their interactions during homework. This adds new insights into how the home context may affect the child's experience of school. Furthermore, this thesis has extended conceptualisations and methodologies surrounding tutored learning.

References

Ablow, J., & Measelle, J. (1993). *Berkeley Puppet Interview: Administration and scoring system manuals*. Berkeley: University of California.

Alexander, K. L., Entwisle, D. R., & Bedinger, S. D. (1994). When expectations work: Race and socioeconomic differences in school performance. *Social Psychology Quarterly*, *57*(4), 283. http://doi.org/10.2307/2787156

Al-Hendawi, M. (2013). Temperament, school adjustment, and academic achievement: Existing research and future directions. *Educational Review*, *65*(2), 177–205. http://doi.org/10.1080/00131911.2011.648371

Allal, L., & Ducrey, G. P. (2000). Assessment of—or in—the zone of proximal development. *Learning and Instruction*, *10*(2), 137–152. http://doi.org/10.1016/S0959-4752(99)00025-0

Appleton, J. J., Christenson, S., & Furlong, M. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools*, *45*(5), 369–386. http://doi.org/10.1002/pits

Atzaba-Poria, N., & Pike, A. (2008). Correlates of parental differential treatment: Parental and contextual factors during middle childhood. *Child Development*, *79*(1), 217–32. http://doi.org/10.1111/j.1467-8624.2007.01121.x

Balli, S. (1997, March). *When mom and dad help: Student reflections on parent involvement with homework.* Paper presented at the Annual Meeting of the American Education Research Association, Chicago, IL.

Balli, S. J., Demo, D. H., & Wedman, J. F. (1998). Family involvement with children's homework: an intervention in the middle grades. *Family Relations*, *47*(2), 149–157.

Barlow, J., Coren, E., & Stewart-Brown, S. (2002). Meta-analysis of the effectiveness of parenting programmes in improving maternal psychosocial health. *British Journal of General Practice*, *52*(476), 223–233. http://doi.org/10.1002/14651858.CD002020.pub2

Bedard, K., & Dhuey, E. (2006). The persistence of early childhood maturity: International evidence of long-run age effects. *The Quarterly Journal of Economics*, *121*(4), 1437–1472.

Belsky, J. (1984). The determinants of parenting: A process model. *Child Development, 55*(1), 83–96.

Belsky, J. (1990). Parental and nonparental child care and children's socioemotional development: A decade in review. *Journal of Marriage and the Family*, *52*(4), 885–903.

Belsky, J., & Barends, N. (2002). Personality and parenting. In M. H. Bornstein (Ed.), *Handbook of Parenting, Volume 3: Being and Becoming a Parent* (2nd ed., pp. 415–438). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Bembenutty, H. (2011). Meaningful and maladaptive homework practices: The role of self-efficacy and self-regulation. *Journal of Advanced Academics, 22*(3), 448–473.

Birch, S., & Ladd, G. W. (1997). The teacher-child relationship and children's early school adjustment. *Journal of School Psychology, 35*(1), 61–79.

Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review*, *15*(1), 1–40.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, *32*(7), 513–531. http://doi.org/10.1037/0003-066X.32.7.513

Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In R. M. Lerner (Ed.), *Handbook of Child Development. Volume 1: Theoretical Models of Human Development* (6th ed., pp. 793–828). Hoboken, New Jersey: Wiley.

Brown, A. L., & Ferrara, R. A. (1999). Diagnosing zones of proximal development. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical Assessments, Volume 3* (p. 225-255). Padstow, Cornwall: Routledge.

Bryce, D., & Whitebread, D. (2012). The development of metacognitive skills: Evidence from observational analysis of young children's behavior during problem-solving. *Metacognition and Learning*, *7*(3), 197–217. http://doi.org/10.1007/s11409-012-9091-2

Buss, A. H., & Plomin, R. (1984). Temperament: Early developing personality traits. *Psychology and Behavioral Sciences* (Vol. 3). Hillsdale, NJ, NJ: Erlbaum. http://doi.org/10.11648/j.pbs.20140304.12

Buss, D. (1981). Predicting parent–child interactions from children's activity level. *Developmental Psychology*, *17*(1), 59–65.

Cadima, J., Doumen, S., Verschueren, K., & Buyse, E. (2015). Child engagement in the transition to school: Contributions of self-regulation, teacher–child relationships

and classroom climate. *Early Childhood Research Quarterly*, *32*(2015), 1–12. http://doi.org/10.1016/j.ecresq.2015.01.008

Campbell, S. B. (1995). Behavior problems in preschool children: A review of recent research. *Journal of Child Psychology and Psychiatry*, *36*(1), 113–49.

Carr, A., & Pike, A. (2012). Maternal scaffolding behavior: Links with parenting style and maternal education. *Developmental Psychology*, *48*(2), 543–51. http://doi.org/10.1037/a0025888

Carter, M., McGee, R., Taylor, B., & Williams, S. (2007). Health outcomes in adolescence: Associations with family, friends and school engagement. *Journal of Adolescence*, *30*(1), 51–62. http://doi.org/10.1016/j.adolescence.2005.04.002

Chaiklin, S. (2003). The zone of proximal development in Vygotsky's analysis of learning and instruction. In A. Kozulin, B. Gindis, V. S. Ageyev, & S. M. Miller (Eds.), *Vygotsky's Educational Theory in Cultural Context* (pp. 39–64). New York, NY: Cambridge University Press.

Chamorro-Premuzic, T., Harlaar, N., Greven, C. U., & Plomin, R. (2010). More than just IQ: A longitudinal examination of self-perceived abilities as predictors of academic performance in a large sample of UK twins. *Intelligence*, *38*(4), 385–392. http://doi.org/10.1016/j.intell.2010.05.002

Chen, C., & Stevenson, H. (1989). Homework: A cross-cultural examination. *Child Development*, *60*(3), 551–561.

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, *6*(4), 284–290.

Coe, R. (2002, September). *It's the effect size, stupid: What effect size is and why it's important.* Paper presented at the Annual Conference of the British Educational Research Association, Exeter, UK.

Coldwell, J., Pike, A., & Dunn, J. (2006). Household chaos - Links with parenting and child behaviour. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 47*(11), 1116–22. http://doi.org/10.1111/j.1469-7610.2006.01655.x

Connell, J. P. (1991). Context, self, and action: A motivational analysis of self-system processes across the life span. In D. Cicchetti & M. Beeghly (Eds.), *The Self in Transition: Infancy to Childhood* (pp. 61–98). Chicago, U.S.: University of Chicago Press.

Connell, J. P., Spencer, M. B., & Aber, J. L. (1994). Educational risk and resilience in African-American youth: Context, self, action, and outcomes in school. *Child Development*, *65*(2), 493–506.

Conner, D. B., & Cross, D. R. (2003). Longitudinal analysis of the presence, efficacy and stability of maternal scaffolding during informal problem-solving interactions. *British Journal of Developmental Psychology*, *21*, 315–334.

Conner, D. B., Knight, D. K., & Cross, D. R. (1997). Mothers' and fathers' scaffolding of their 2-year-olds during problem-solving and literacy interactions. *British Journal of Developmental Psychology*, *15*, 323–338.

Cooper, H. (1989). Synthesis of research on homework. *Educational Leadership*, *47*(3), 85–91.

Cooper, H., Lindsay, J. J., Nye, B., & Greathouse, S. (1998). Relationships among attitudes about homework, amount of homework assigned and completed, and

student achievement. *Journal of Educational Psychology*, *90*(1), 70–83. http://doi.org/10.1037//0022-0663.90.1.70

Cooper, H., Lindsay, J., & Nye, B. (2000). Homework in the home: How student, family, and parenting-style differences relate to the homework process. *Contemporary Educational Psychology*, *25*(4), 464–487. http://doi.org/10.1006/ceps.1999.1036

Cooper, H., Robinson, J. C., & Patall, E. A. (2006). Does homework improve academic achievement? A synthesis of research, 1987-2003. *Review of Educational Research*, *76*(1), 1–62. http://doi.org/10.3102/00346543076001001

Cooper, H., & Valentine, J. (2001). Using research to answer practical questions about homework. *Educational Psychologist*, *36*(3), 143–153.

Coplan, R., Arbeau, K., & Armer, M. (2008). Don't fret, be supportive! Maternal characteristics linking child shyness to psychosocial and school adjustment in kindergarten. *Journal of Abnormal Child Psychology*, *36*, 359–371.

Corno, L. (1996). Homework is a complicated thing. *Educational Researcher*, *25*(8), 27–30.

Corno, L. (2000). Looking at homework differently. *The Elementary School Journal*, *100*(5), 529–548.

Cowan, P. A., Cowan, C. P., Schulz, M. S., & Heming, G. (1994). Prebirth to preschool family factors in children's adaptation to kindergarten. In R. D. Parke & S. G. Kellam (Eds.), *Exploring Family Relationships With Other Social Contexts* (pp. 75–114). Hillsdale, NJ: Erlbaum.

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, *113*(3), 487–496.

Davis, M. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*(1), 113–126.

Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology*, *19*(2), 294–304. http://doi.org/10.1037/0893-3200.19.2.294

Deater-Deckard, K. (2015, March). *Chaos in the house: advancing understanding of socio-economic risk and the family context*. Paper presented at the Society for Research in Child Development biennial meeting, Philadelphia, PA.

Deater-Deckard, K., & Petrill, S. A. (2004). Parent-child dyadic mutuality and child behavior problems: an investigation of gene-environment processes. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *45*(6), 1171–9. http://doi.org/10.1111/j.1469-7610.2004.00309.x

Deater-Deckard, K., Pylas, M. V, & Petrill, S. A. (1997). *Parent-Child Interaction System (PARCHISY)*. London, England: Institute of Psychiatry.

Desimone, L. (1999). Linking parent involvement with student achievement: Do race and income matter? *The Journal of Educational Research*, *93*(1), 11–30. http://doi.org/10.1080/00220679909597625

Díaz, R. M., Neal, C. J., & Amaya-Williams, M. (1990). The social origins of self-regulation. In L. C. Moll (Ed.), *Vygotsky and Education: Instructional*

Implications and Apprlications of Sociohistorical Psychology (pp. 127–154). New York, NY: Cambridge University Press.

Dix, T. (1991). The affective organization of parenting: adaptive and maladaptive processes. *Psychological Bulletin*, *110*(1), 3–25.

Du Prel, J.-B., Hommel, G., Röhrig, B., & Blettner, M. (2009). Confidence interval or p-value?: Part 4 of a series on evaluation of scientific publications. *Deutsches Ärzteblatt International*, *106*(19), 335–9. http://doi.org/10.3238/arztebl.2009.0335

Dunn, E. C., Masyn, K. E., Yudron, M., Jones, S. M., & Subramanian, S. V. (2014). Translating multilevel theory into multilevel research: challenges and opportunities for understanding the social determinants of psychiatric disorders. *Social Psychiatry and Psychiatric Epidemiology*, *49*(6), 859–872. http://doi.org/10.1007/s00127-013-0809-5

Dunn, L. M., Dunn, D. M., & Styles, B. (2009). *British Picture Vocabulary Scale (3rd Edition)*. London, England: GL Assessment.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, *41*(10), 1040–1048.

Eccles, J. S. (1983). Expectancies, values and academic behaviors. In J. T. Spence (Ed.), *Achievement and Achievement Motives: Psychological and Sociological Approaches* (pp. 75–146). San Francisco: W. H. Freeman and Company.

Eccles, J. S., Adler, T., & Kaczala, C. (1982). Socialization of achievement attitudes and beliefs: Parental influences. *Child Development*, *53*(2), 310–321.

Eccles, J. S., & Harold, R. D. (1996). Family involvement in children's and adolescents' schooling. In A. Booth & J. F. Dunn (Eds.), *Family-School Links: How Do They*

Affect Educational Outcomes? (pp. 3–34). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Efron, B. (1987). Better bootstrap confidence intervals. *Journal of the American Statistical Association*, *82*(397), 171–185.

Else-Quest, N. M., Hyde, J. S., & Hejmadi, A. (2008). Mother and child emotions during mathematics homework. *Mathematical Thinking and Learning*, *10*(1), 5–35.

Englund, M. M., Luckner, A. E., Whaley, G. J. L., & Egeland, B. (2004). Children's achievement in early elementary school: longitudinal effects of parental involvement, expectations, and quality of assistance. *Journal of Educational Psychology*, *96*(4), 723–730. http://doi.org/10.1037/0022-0663.96.4.723

Entwisle, D. R., Alexander, K. L., Pallas, A. M., & Cadigan, D. (1987). The emergent academic self-image of first graders: Its response to social structure. *Child Development*, *58*(5), 1190–1206.

Entwisle, D. R., & Baker, D. P. (1983). Gender and young children's expectations for performance in Arithmatic. *Developmental Psychology*, *19*(2), 200–209.

Epstein, J. L. (1987). Parent involvement: What research says to administrators. *Education and Urban Society*, *19*(2), 119–136.

Epstein, J. L. (1992). School and family partnerships. In M. Alkin (Ed.), *Encyclopaedia of Educational Research* (6th ed., pp. 1139–1151). New York: MacMiillan.

Epstein, J. L. (2002). School, family, and community partnerships: Caring for the children we share. In J. L. Epstein, M. G. Sanders, B. S. Simon, K. C. Salinas, N. R. Jansorn, & F. L. Van Voorhis (Eds.), *School, Family, and Community*

Partnerships: Your Handbook for Action (2nd ed., pp. 7–29). Thousand Oaks, California: Corwin Press.

Epstein, J. L. (2011). *School, Family, and Community Partnerships: Preparing Educators and Improving Schools* (2nd ed.). Boulder, Colorado: Westview Press.

Epstein, J. L., & Lee, S. (1995). National patterns of school and family connections in the middle grades. In B. Ryan, G. Adams, T. Gulotta, R. Weissberg, & R. Hampton (Eds.), *The Family-School Connection: Theory, Research and Practice* (pp. 108–154). Thousand Oaks, California: Sage Publications.

Estell, D., & Perdue, N. (2013). Social support and behavioral and affective school engagement: the effects of peers, parents, and teachers. *Psychology in the Schools*, *50*(4), 325–339. http://doi.org/10.1002/pits

Evans, G. W., Kliewer, W., & Martin, J. (1991). The role of the physical environment in the health and well-being of children. In H. E. Schroeder (Ed.), *New Directions in Health Psychology Assessment* (pp. 127–157). New York: Hemisphere Publishing Corporation.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, *13*(1), 1–22.

Fernandes-Richards, S. M. (2006). *A delicate balance of challenge and support: Parental scaffolding of children's learning and its influence on emotion during homework* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses (UMI number: 3342501).

Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics* (4th ed.). London: Sage.

Fredricks, J., Blumenfeld, P., & Paris, A. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59–109.

Fredricks, J., & Eccles, J. S. (2002). Children's competence and value beliefs from childhood to adolescence: Growth trajectories in two "male-typed" domains. *Journal of Developmental Psychology*, *38*(519-533).

Frey, K. S., Nolen, S. B., Van Schoiack-Edstrom, L., & Hirschstein, M. K. (2005). Effects of a school-based social–emotional competence program: Linking children's goals, attributions, and behavior. *Journal of Applied Developmental Psychology*, *26*(2), 171–200. http://doi.org/10.1016/j.appdev.2004.12.002

Galindo, C., & Sheldon, S. B. (2012). School and home connections and children's kindergarten achievement gains: The mediating role of family involvement. *Early Childhood Research Quarterly*, *27*(1), 90–103. http://doi.org/10.1016/j.ecresq.2011.05.004

Gauvain, M. (2005). Scaffolding in socialization. *New Ideas in Psychology*, *23*(2005), 129–139. http://doi.org/10.1016/j.newideapsych.2006.05.004

Gauvain, M., & Fagot, B. I. (1995). Child temperament as a mediator of mother-toddler problem solving. *Social Development*, *4*(3), 257–276. http://doi.org/10.1111/j.1467-9507.1995.tb00065.x

Gelfand, D. M., Teti, D. M., Seiner, S. a, & Jameson, P. B. (1996). Helping mothers fight depression: Evaluation of a home-based intervention program for depressed mothers and their infants. *Journal of Clinical Child Psychology*, *25*(4), 406–422. http://doi.org/10.1207/s15374424jccp2504

Gill, B. P., & Schlossman, S. L. (2004). Villain or savior? The American discourse on homework, 1850-2003. *Theory Into Practice*, *43*(3), 174–181.

Gonida, E., & Cortina, K. (2014). Parental involvement in homework: relations with parent and student achievement-related motivational beliefs and achievement. *British Journal of Educational Psychology*, *84*(3), 376–396.

Goodnow, J. (1990). The socialization of cognition: What's involved? In J. W. Stigler, R. A. Shweder, & G. H. Herdt (Eds.), *Cultural Psychology: Essays on Comparative Human Development* (pp. 259–286). New York, NY: Cambridge University Press.

Granott, N. (2005). Scaffolding dynamically toward change: Previous and new perspectives. *New Ideas in Psychology*, *23*(3), 140–151. http://doi.org/10.1016/j.newideapsych.2006.07.002

Granott, N., Fischer, K. W., & Parziale, J. (2002). Bridging to the unknown: A transition mechanism in learning and development. In N. Granott & J. Parziale (Eds.), *Microdevelopment: Transition Processes in Development and Learning* (pp. 131–156). Cambridge, UK: Cambridge University Press.

Granott, N., & Parziale, J. (2002). Microdevelopment: A process-oriented perspective for studying development and learning. In N. Granott & J. Parziale (Eds.), *Microdevelopment: Transition Processes in Development and Learning* (pp. 1–30). Cambridge, UK: Cambridge University Press.

Grolnick, W. S., Gurland, S. T., DeCourcey, W., & Jacob, K. (2002). Antecedents and consequences of mothers' autonomy support: An experimental investigation. *Developmental Psychology*, *38*(1), 143–155. http://doi.org/10.1037//0012-1649.38.1.143

Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-regulation and competence in school. *Journal of Educational Psychology, 81*(2), 143–154. http://doi.org/10.1037//0022-0663.81.2.143

Guay, F., Marsh, H. W., & Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology, 95*(1), 124–136. http://doi.org/10.1037/0022-0663.95.1.124

Hadwin, A. F., Wozney, L., & Pontin, O. (2005). Scaffolding the appropriation of self-regulatory activity: A socio-cultural analysis of changes in teacher–student discourse about a graduate research portfolio. *Instructional Science, 33*, 413–450. http://doi.org/10.1007/s11251-005-1274-7

Halle, T. G., Kurtz-Costes, B., & Mahoney, J. L. (1997). Family influences on school achievement in low-income, African American children. *Journal of Educational Psychology, 89*(3), 527–537. http://doi.org/10.1037/0022-0663.89.3.527

Hallgren, K. (2012). Computing inter-rater reliability for observational data: An overview and tutorial. *Tutorials in Quantitative Methods for Psychology, 8*(1), 23–34.

Hammond, S. I., Mu, U., Carpendale, J. I. M., Bibok, M. B., & Liebermann-Finestone, D. P. (2012). The effects of parental scaffolding on preschoolers' executive function. *Developmental Psychology, 48*(1), 271–281. http://doi.org/10.1037/a0025519

Harter, S. (1982). The perceived competence scale for children. *Child Development, 53*(1), 87–97.

Harter, S., & Pike, R. (1984). The pictorial scale of perceived competence and social acceptance for young children. *Child Development, 55*(6), 1969–1982.

Heagle, K., Timmons, K., Hargreaves, F. & Palletier, J. (2015, June). *The social kindergartener: Comparing children's perspectives of full-day and half-day kindergarten*. Paper presented at the 45th Annual Meeting of the Jean Piaget Society, Toronto, Canada.

Hess, R. D., Holloway, S. S. D., Dickson, W. P., & Price, G. G. (1984). Maternal variables as predictors of children's school readiness and later achievement in vocabulary and mathematics in sixth grade. *Child Development, 55*(5), 1902–1912.

Higgins, G. (2005). Statistical significance testing: The bootstrapping method and an application to self-control theory. *The Southwest Journal of Criminal Justice, 2*(1), 54–76.

Hokoda, A., & Fincham, F. D. (1995). Origins of children's helpless and mastery achievement patterns in the family. *Journal of Educational Psychology, 87*(3), 375–385. http://doi.org/10.1037//0022-0663.87.3.375

Hoover-Dempsey, K. V., Battiato, A. C., Walker, J. M. T., Reed, R. P., DeJong, J. M., & Jones, K. P. (2001). Parental involvement in homework. *Educational Psychologist, 36*(3), 195–209. http://doi.org/10.1207/S15326985EP3603_5

Hoover-Dempsey, K. V., & Sandler, H. M. (1995). Parental involvement in children's education: Why does it make a difference. *The Teachers College Record, 97*(2), 311–331.

Hughes, M., & Greenhough, P. (2008). "We do it a different way at my school": Mathematics homework as a site for tension and conflict. In A. Watson & P.

Winbourne (Eds.), *New Directions for Situated Cognition in Mathematics Education* (pp. 129–360). Kluwer Academic Publishers.

Hyde, J. S., Else-Quest, N. M., Alibali, M. W., Knuth, E., & Romberg, T. (2006). Mathematics in the home: Homework practices and mother–child interactions doing mathematics. *Journal of Mathematical Behavior*, *25*, 136–152. http://doi.org/10.1016/j.jmathb.2006.02.003

Johnson, J., & Martin, C. (1985). Parents' beliefs and home learning environments: Effects on cognitive development. In I. Sigel, A. McGillicuddy-DeLisi, & J. Goodnow (Eds.), *Parental Belief Systems: The Psychological Consequences for Children* (2nd ed., pp. 95–114). New York: Lawrence Erlbaum Associates.

Jussim, L., Eccles, J., & Madon, S. (1996). Social perception, social stereotypes, and teacher expectations: accuracy and the quest for the powerful self-fulfilling prophecy. *Advances in Experimental Social Psychology*. http://doi.org/10.1016/S0065-2601(08)60240-3

Katz, I., Kaplan, A., & Buzukashvily, T. (2011). The role of parents' motivation in students' autonomous motivation for doing homework. *Learning and Individual Differences*, *21*(4), 376–386. http://doi.org/10.1016/j.lindif.2011.04.001

Keith, T. Z., Keith, P. B., Quirk, K. J., Sperduto, J., Santillo, S., & Killings, S. (1998). Longitudinal effects of parent involvement on high school grades. *Journal of School Psychology*, *36*(3), 335–363. http://doi.org/10.1016/S0022-4405(98)00008-9

Kenney-Benson, G. a, & Pomerantz, E. M. (2005). The role of mothers' use of control in children's perfectionism: implications for the development of children's

depressive symptoms. *Journal of Personality*, *73*(1), 23–46. http://doi.org/10.1111/j.1467-6494.2004.00303.x

Klein, M. R. & Lengua, L. J. (2015, March). *Temperamental surgency predicts later adjustment problems in the preschool period*. Poster presented at the Society for Research in Child Development biennial meeting, Philadelphia, PA.

Knollmann, M., & Wild, E. (2007). Quality of parental support and students' emotions during homework : Moderating effects of students ' motivational orientations. *European Journal of Psychology of Education*, *22*(1), 63–76.

Kochanska, G., Clark, A., & Goldman, M. (1997). Implications of mothers' personality for their parenting and their young children's developmental outcomes. *Journal of Personality*, *65*(2), 387–420.

Kochanska, G., Philibert, R. A., & Barry, R. A. (2009). Interplay of genes and early mother–child relationship in the development of self-regulation from toddler to preschool age. *Journal of Child Psychology and Psychiatry*, *50*(11), 1331–1338. http://doi.org/10.1111/j.1469-7610.2008.02050.x.Interplay

Kralovec, E., & Buell, J. (2001). End homework now. *Educational Leadership*, *58*(7), 39–42.

Ladd, G. W., & Price, J. (1987). Predicting children's social and school adjustment following the transition from preschool to kindergarten. *Child Development*, *58*(5), 1168–1189.

Lajoie, S. P. (2005). Extending the scaffolding metaphor. *Instructional Science*, *33*(5-6), 541–557. http://doi.org/10.1007/s11251-005-1279-2

Lee, K., & Karmiloff-Smith, A. (2002). Macro- and micro-developmental research: Assumptions, research strategies, constraints, and utilities. In N. Granott & J. Parziale (Eds.), *Microdevelopment: Transition Processes in Development and Learning* (pp. 243–266). New York: Cambridge University Press.

Lee, I. A. & Preacher, K. J. (2013, September). Calculation for the test of the difference between two dependent correlations with one variable in common [Computer software]. Available from http://quantpsy.org.

Leerkes, E. M., Blankson, A. N., O'Brien, M., Calkins, S. D., & Marcovitch, S. (2011). The relation of maternal emotional and cognitive support during problem solving to pre-academic skills in preschoolers. *Infant and Child Development, 20*, 353–370. http://doi.org/10.1002/icd

Leone, C., & Richards, H. (1989). Classwork and homework in early adolescence: The ecology of achievement. *Journal of Youth and Adolescence, 18*(6), 531–548.

Levin, I., Levy-Shiff, R., Appelbaum-Peled, T., Katz, I., Komar, M., & Meiran, N. (1997). Antecedents and consequences of maternal involvement in children's homework: A longitudinal analysis. *Journal of Applied Developmental Psychology, 18*, 207–227.

Lewis, M. (2002). Interacting time scales in personality (and cognitive) development: Intentions, emotions, and emergent forms. In N. Granott & J. Parziale (Eds.), *Microdevelopment: Transition Processes in Development and Learning* (pp. 183–212). New York: Cambridge University Press.

Lidz, C. S. (1987). *Dynamic Assessment: An Interactional Approach to Evaluating Learning Potential*. New York, NY: Guilford Press.

Lindberg, S. M., Hyde, J. S., & Hirsch, L. M. (2008). Gender and mother-child interactions during mathematics homework: The importance of individual differences. *Merrill-Palmer Quarterly*, *54*(2), 232–255. http://doi.org/10.1353/mpq.2008.0017

Lindsay, G., & Cullen, M. A. (2010). *Evaluation of the Parenting Early Intervention Programme: A Short Report to Inform Local Commissioning Processes*. London: Department for Education.

Linver, M. R., Brooks-Gunn, J., & Kohen, D. E. (2002). Family processes as pathways from income to young children's development. *Developmental Psychology*, *38*(5), 719–734. http://doi.org/10.1037/0012-1649.38.5.719

Litowitz, B. E. (1993). Deconstruction in the zone of proximal development. In E. A. Forman, N. Minick, & C. Addison Stone (Eds.), *Contexts for Learning: Sociocultural Dynamics in Children's Development* (pp. 184–198). New York, NY: Oxford University Press.

Marjoribanks, K. (1987). Ability and attitude correlates of academic achievement: Family-group differences. *Journal of Educational Psychology*, *79*(2), 171–178. http://doi.org/10.1037/0022-0663.79.2.171

Marsh, H. W., & O'Mara, A. (2008). Reciprocal effects between academic self-concept, self-esteem, achievement, and attainment over seven adolescent years: Unidimensional and multidimensional perspectives of self-concept. *Personality & Social Psychology Bulletin*, *34*(4), 542–52. http://doi.org/10.1177/0146167207312313

Marshall, I. D., & Jackman, G.-A. (2015). Parental involvement, student active engagement and the "secondary slump" phenomenon — Evidence from a Three-

Year Study in a Barbadian Secondary School. *International Education Studies*, *8*(7), 84–96. http://doi.org/10.5539/ies.v8n7p84

Marzano, R. J., & Pickering, D. J. (2007). The case for and against homework. *Educational Leadership*, *64*(6), 74–79.

Matheny, A., Wachs, T., Ludwig, J., & Phillips, K. (1995). Bringing order out of chaos: Psychometric characteristics of the confusion, hubbub, and order scale. *Journal of Applied Developmental Psychology*, *16*, 429–444.

McLoyd, V. C. (1990). The impact of economic hardship on black families and children: psychological distress, parenting, and socioemotional development. *Child Development*, *61*(2), 311–346. http://doi.org/10.2307/1131096

Measelle, J., Ablow, J., Cowan, P., & Cowan, C. (1998). Assessing young children's views of their academic, social, and emotional lives: An evaluation of the self-perception scales of the Berkeley Puppet Interview. *Child Development*, *69*(6), 1556–1576.

Meins, E. (1997). Security of attachment and maternal tutoring strategies: Interaction within the zone of proximal development. *British Journal of Developmental Psychology*, *15*, 129–144.

Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology*, *88*(2), 203–214.

Mokrova, I. (2015, March). *Engagement with learning and academic achievement in 2nd grade students living in high poverty rural areas*. Poster presented at the Society for Research in Child Development biennial meeting, Philadelphia, PA.

Mooney, C., & Duval, R. (1993). *Bootstrapping: A nonparametric approach to statistical inference*. Newbury Park, California, California: Sage Publications.

Mudrick, H. & Robinson, J. L. (2015, March). *Longitudinal stability and cross-contextual models of effortful control from pre-kindergarten to first grade*. Paper presented at the Society for Research in Child Development biennial meeting, Philadelphia, PA.

Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, *75*(1), 33–52. http://doi.org/10.1037//0022-3514.75.1.33

Muijs, R. D. (1997). Predictors of academic achievement and academic self-concept: a longitudinal perspective. *British Journal of Educational Psychology*, *67*, 263–277.

Mulvaney, M. K., McCartney, K., Bub, K. L., & Marshall, N. L. (2006). Determinants of dyadic scaffolding and cognitive outcomes in first graders. *Parenting: Science and Practice*, *6*(4), 297–320.

Murray, L., Woolgar, M., Martins, C., Christaki, A., Hipwell, A. & Cooper, P. (2006). Conversations around homework: Links to parental mental health, family characteristics and child psychological functioning. *British Journal of Developmental Psychology*, 24, 125-149.

Murphey, D. (1992). Constructing the child: Relations between parents' beliefs and child outcomes. *Developmental Review*, *12*(2), 199–232. http://doi.org/10.1016/0273-2297(92)90009-Q

Nader-Grosbois, N., & Lefèvre, N. (2011). Self-regulation and performance in problem-solving using physical materials or computers in children with intellectual

disability. *Research in Developmental Disabilities*, *32*(5), 1492–505. http://doi.org/10.1016/j.ridd.2011.01.020

Nader-Grosbois, N., & Lefèvre, N. (2012). Parents' regulation and self-regulation and performance in children with intellectual disability in problem-solving using physical materials or computers. *Research in Developmental Disabilities*, *33*(2), 449–60. http://doi.org/10.1016/j.ridd.2011.10.005

Nader-Grosbois, N., Normandeau, S., Ricard-Cossette, M., & Quintal, G. (2008). Mother's, father's regulation and child's self-regulation in a computer-mediated learning situation. *European Journal of Psychology of Education*, *23*(1), 95–115.

Natriello, G., & McDill, E. (1986). Performance standards, student effort on homework, and academic achievement. *Sociology of Education*, *59*(1), 18–31.

Neitzel, C., & Stright, A. D. (2003). Mothers' scaffolding of children's problem solving: Establishing a foundation of academic self-regulatory competence. *Journal of Family Psychology*, *17*(1), 147–159. http://doi.org/10.1037/0893-3200.17.1.147

Neitzel, C., & Stright, A. D. (2004). Parenting behaviours during child problem solving: The roles of child temperament, mother education and personality, and the problem-solving context. *International Journal of Behavioral Development*, *28*(2), 166–179. http://doi.org/10.1080/01650250344000370

Nelson, L. J., Hart, C. H., Evans, C. A., Coplan, R. J., Roper, S. O., & Robinson, C. C. (2009). Behavioral and relational correlates of low self-perceived competence in young children. *Early Childhood Research Quarterly*, *24*(3), 350–361. http://doi.org/10.1016/j.ecresq.2009.06.002

Neuenschwander, M. P., Vida, M., Garrett, J. L., & Eccles, J. S. (2007). Parents' expectations and students' achievement in two western nations. *International*

Journal of Behavioral Development, *31*(6), 594–602. http://doi.org/10.1177/0165025407080589

Ng, F. F.-Y., Kenney-Benson, G. A., & Pomerantz, E. M. (2004). Children's achievement moderates the effects of mothers' use of control and autonomy support. *Child Development*, *75*(3), 764–780.

Núñez, J. C., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. L. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary, junior high, and high school students. *Metacognition and Learning*, *10*, 375–406. http://doi.org/10.1007/s11409-015-9135-5

Olson, S. L., Bates, J. E., & Bayles, K. (1990). Early antecedents of childhood impulsivity: The role of parent-child interaction, cognitive competence, and temperament. *Journal of Abnormal Child Psychology*, *18*(3), 317–334.

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework : A research synthesis. *Review of Educational Research*, *78*(4), 1039–1101.

Perry, K., & Weinstein, R. (1998). The social context of early schooling and children's school adjustment. *Educational Psychologist*, *33*(4), 177–194. http://doi.org/10.1207/s15326985ep3304

Pianta, R. C., & Harbers, K. L. (1996). Observing mother and child behavior in a problem-solving situation at school entry: Relations with academic achievement. *Journal of School Psychology*, *34*(3), 307–322. http://doi.org/10.1016/0022-4405(96)00017-9

Pianta, R. C., Nimetz, S. L., & Bennett, E. (1997). Mother-child relationships, teacher-child relationships, and school outcomes in preschool and kindergarten. *Early*

Childhood Research Quarterly, *12*(3), 263–280. http://doi.org/10.1016/S0885-2006(97)90003-X

Pianta, R. C., Smith, N., & Reeve, R. E. (1991). Observing mother and child behavior in a problem-solving situation at school entry: Relations with classroom adjustment. *School Psychology Quarterly*, *6*(1), 1–15. http://doi.org/10.1037/h0088238

Pike, A., Coldwell, J., & Dunn, J. (2006). *Family relationships in middle childhood*. London: National Children's Bureau/Joseph Rowntree Foundation.

Pino-Pasternak, D. (2014). Applying an observational lens to identify parental behaviours associated with children's homework motivation. *The British Journal of Educational Psychology*, *84*(3), 352–75. http://doi.org/10.1111/bjep.12043

Pino-Pasternak, D., & Whitebread, D. (2010). The role of parenting in children's self-regulated learning. *Educational Research Review*, *5*(3), 220–242. http://doi.org/10.1016/j.edurev.2010.07.001

Pino-Pasternak, D., Whitebread, D., & Tolmie, A. (2010). A multidimensional analysis of parent–child interactions During academic tasks and their relationships with children's self-regulated learning. *Cognition and Instruction*, *28*(3), 219–272. http://doi.org/10.1080/07370008.2010.490494

Plomin, R., DeFries, J. C., Knopik, V. S. & Neiderhiser, J. M. (2016). Top 10 replicated findings from behavioral genetics. *Perspectives on Psychological Science*, *11*(1), 3-23'

Pol, J. Van De, Volman, M., & Beishuizen, J. (2010). Scaffolding in teacher–student interaction: A decade of research. *Educational Psychology Review*, *22*, 271–296. http://doi.org/10.1007/s10648-010-9127-6

Pomerantz, E. M., Moorman, E. A., & Litwack, S. D. (2007). The how, whom, and why of parents' involvement in children's academic lives: more is not always better. *Review of Educational Research*, *77*(3), 373–410. http://doi.org/10.3102/003465430305567

Pomerantz, E. M., Ng, F. F.-Y., & Wang, Q. (2006). Mothers' mastery-oriented involvement in children's homework: Implications for the well-being of children with negative perceptions of competence. *Journal of Educational Psychology*, *98*(1), 99–111. http://doi.org/10.1037/0022-0663.98.1.99

Pomerantz, E. M., Wang, Q., & Ng, F. F.-Y. (2005). Mothers' affect in the homework context: the importance of staying positive. *Developmental Psychology*, *41*(2), 414–27. http://doi.org/10.1037/0012-1649.41.2.414

Power, T. J., Werba, B. E., Watkins, M. W., Angelucci, J. G., & Eiraldi, R. B. (2006). Patterns of parent-reported homework problems among ADHD-referred and non-referred children. *School Psychology Quarterly*, *21*(1), 13–33. http://doi.org/10.1521/scpq.2006.21.1.13

Pratt, M. W., Green, D., MacVicar, J., & Bountrogianni, M. (1992). The mathematical parent: Parental scaffolding, parenting style, and learning outcomes in long-division mathematics homework. *Journal of Applied Developmental Psychology*, *13*, 17–34.

Pratt, M. W., Kerig, P., Cowan, P. A., & Cowan, C. P. (1988). Mothers and fathers teaching 3-year-olds: Authoritative parenting and adult scaffolding of young children's learning. *Developmental Psychology*, *24*(6), 832–839.

Prinzie, P., Stams, G. J. J. M., Deković, M., Reijntjes, A. H. a, & Belsky, J. (2009). The relations between parents' Big Five personality factors and parenting: A meta-

analytic review. *Journal of Personality and Social Psychology*, *97*(2), 351–362. http://doi.org/10.1037/a0015823

Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment*, *87*(1), 103–113. http://doi.org/10.1207/s15327752jpa8701_09

Ramdass, D., & Zimmerman, B. J. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics*, *22*(2), 194–218. http://doi.org/10.1177/1932202X1102200202

Reschly, C. L., & Christenson, S. L. (2012). Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of Research on Student Engagement* (pp. 3–20). Ney York, N.Y.: Springer.

Richman, E., & Rescorla, L. (1995). Academic orientation and warmth in mothers and fathers of preschoolers: Effects on academic skills and self-perceptions of competence. *Early Education and Development*, *6*(3), 197–213. http://doi.org/10.1207/s15566935eed0603

Rimm-Kaufman, S. E., Curby, T. W., Grimm, K. J., Nathanson, L., & Brock, L. L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology*, *45*(4), 958–72. http://doi.org/10.1037/a0015861

Rist, R. C. (1970). Student social class and teacher expectations: The self-fulfilling prophecy in ghetto Education. *Harvard Educational Review*, *40*(3), 411–451.

Robinson, J. B., Burns, B. M., & Winders, D. (2009). Maternal scaffolding and attention regulation in children living in poverty. *Journal of Applied*

Developmental Psychology, *30*(2), 82–91. http://doi.org/10.1016/j.appdev.2008.10.013

Roebers, C. M., Cimeli, P., Röthlisberger, M., & Neuenschwander, R. (2012). Executive functioning, metacognition, and self-perceived competence in elementary school children: an explorative study on their interrelations and their role for school achievement. *Metacognition and Learning*, *7*(3), 151–173. http://doi.org/10.1007/s11409-012-9089-9

Rogoff, B. (1990). *Apprenticeship in Thinking: Cognitive Development in Social Context*. New York, NY: Oxford University Press.

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research*, *81*(4), 493–529. http://doi.org/10.3102/0034654311421793

Rubie-Davies, C. M., Peterson, E., Irving, E., Widdowson, D., & Dixon, R. (2010). Expectations of achievement: Student, teacher and parent perceptions. *Research in Education*, *83*, 36–53. http://doi.org/10.7227/RIE.83.4

Saloman, G., & Perkins, D. N. (1998). Individual and social aspects of learning. *Review of Research in Education*, *23*, 1–24.

Salonen, P., Lepola, J., & Vauras, M. (2007). Scaffolding interaction in parent-child dyads: Multimodal analysis of parental scaffolding with task and non-task oriented children. *European Journal of Psychology of Education*, *22*(1), 77–96.

Sameroff, A. J. (2009). *The Transactional Model of Development: How Children and Contexts Shape Each Other*. Washington, DC: American Psychological Association.

Sameroff, A. J. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, *81*(1), 6–22. http://doi.org/10.1111/j.1467-8624.2009.01378.x

Sameroff, A. J., & Chandler, M. J. (1975). Reproductive risk and the continuum of caretaking causality. In D. Horowitz, M. Hetherington, S. Scarr-Salapatek, & G. Siegel (Eds.), *Review of Child Development Research (Vol 4)*. Chicago, IL: University of Chicago Press.

Sameroff, A. J., & Fiese, B. H. (2000). Transactional regulation: The developmental ecology of early intervention. In J. Shonkoff, S. Meisels, & E. Zigler (Eds.), *Handbook of Early Childhood Intervention* (2nd ed., pp. 135–159). Cambridge University Press. http://doi.org/http://dx.doi.org/10.1017/CBO9780511529320.009

Sameroff, A. J., & Mackenzie, M. J. (2003). Research strategies for capturing transactional models of development: the limits of the possible. *Development and Psychopathology*, *15*, 613–640. http://doi.org/10.1017/S0954579403000312

Sanders, M. R., Morawska, A., Haslam, D. M., Filus, A., & Fletcher, R. (2013). Parenting and Family Adjustment Scales (PAFAS): Validation of a brief parent-report measure for use in assessment of parenting skills and family relationships. *Child Psychiatry and Human Development*, *45*(3), 255–272. http://doi.org/10.1007/s10578-013-0397-3

Sanson, A., & Rothbart, M. (1995). Child temperament and parenting. In W. Kessen (Ed.), *Handbook of parenting: Vol. 4 Applied and practical parenting* (pp. 229–341). Mahwah, New Jersey: Erlbaum.

Sawyer, J. (2015, June). *Preschoolers' self-communication in playful versus non-playful contexts*. Paper presented at the 45th Annual Meeting of the Jean Piaget Society, Toronto, Canada.

Schunk, D. H., & Zimmerman, B. J. (1997). Social origins of self-regulatory competence. *Educational Psychologist*, *32*(4), 195–208.

Scott-Jones, D. (1995). Parent-child interactions and school achievement. In B. A. Ryan, G. R. Adams, T. P. Gullotta, R. P. Weissberg, & R. L. Hampton (Eds.), *The Family-School Connection: Theory, Research and Practice* (pp. 75–107). California: Sage.

Seginer, R. (1983). Parents' educational expectations and children's academic achievements: A literature review. *Merrill-Palmer Quarterly*, *29*(1), 1–23.

Sharp, C., Keys, W., & Benefield, P. (2001). *Homework: A Review of Recent Research*. Berkshire: National Foundation for Educational Research.

Sigel, I. E., & Parke, R. D. (1987). Structural analysis of parent-child research models. *Journal of Applied Developmental Psychology*, *8*(2), 123–137.

Simons, L. G., & Conger, R. D. (2007). Linking mother-father differences in parenting to a typology of family parenting styles and adolescent outcomes. *Journal of Family Issues*, *28*(2), 212–241. http://doi.org/10.1177/0192513X06294593

Simpkins, S. D., Weiss, H. B., McCartney, K., Kreider, H. M., & Dearing, E. (2006). Mother-child relationship as a moderator of the relation between family educational involvement and child achievement. *Parenting: Science and Practice*, *6*(1), 49–57.

Skinner, E., & Belmont, M. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571–581.

Smith, J. R., Brooks-Gunn, J., & Klebanov, P. K. (1997). Consequences of living in poverty for young children's cognitive and verbal ability and early school achievement. In G. J. Duncan & J. Brooks-Gunn (Eds.), *Consequences of Growing Up Poor* (pp. 132–189). New York: Russell Sage Foundation.

Smith-Donald, R., Raver, C. C., Hayes, T., & Richardson, B. (2007). Preliminary construct and concurrent validity of the Preschool Self-Regulation Assessment (PSRA) for field-based research. *Early Childhood Research Quarterly, 22*(2), 173–187. http://doi.org/10.1016/j.ecresq.2007.01.002

Solomon, Y., Warin, J., & Lewis, C. (2002). Helping with homework? Homework as a site of tension for parents and teenagers. *British Educational Research Journal, 28*(4), 603–622.

Spinath, B., Spinath, F. M., Harlaar, N., & Plomin, R. (2006). Predicting school achievement from general cognitive ability, self-perceived ability, and intrinsic value. *Intelligence, 34*(4), 363–374. http://doi.org/10.1016/j.intell.2005.11.004

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87, 245-251.

Steinberg, L., Lamborn, S. D., Dornbusch, S. M., & Darling, N. (1992). Impact of parenting practices on adolescent achievement: authoritative parenting, school involvement, and encouragement to succeed. *Child Development, 63*(5), 1266–1281.

Stipek, D. (1981). Children's perceptions of their own and their classmates' ability. *Journal of Educational Psychology*, *73*(3), 404–410.

Stright, A. D., Neitzel, C., Sears, K. G., & Hoke-Sinex, L. (2001). Instruction begins in the home: Relations between parental instruction and children's self-regulation in the classroom. *Journal of Educational Psychology*, *93*(3), 456–466. http://doi.org/10.1037//0022-0663.93.3.456

Tharp, R., & Gallimore, R. (1998). A theory of teaching as assisted performance. In D. Faulkner, K. Littleton, & M. Woodhead (Eds.), *Learning Relationships in the Classroom* (pp. 93–110). Padstow, Cornwall: Routledge.

Tiedemann, J. (2000). Parents' gender stereotypes and teachers' beliefs as predictors of children's concept of their mathematical ability in elementary school. *Journal of Educational Psychology*, *92*(1), 144–151. http://doi.org/10.1037/0022-0663.92.1.144

Trautwein, U. (2007). The homework–achievement relation reconsidered: Differentiating homework time, homework frequency, and homework effort. *Learning and Instruction*, *17*(3), 372–388. http://doi.org/10.1016/j.learninstruc.2007.02.009

Trautwein, U., & Köller, O. (2003). The relationship between homework and achievement — Still much of a mystery. *Educational Psychology Review*, *15*(2), 115–145.

Trautwein, U., Lüdtke, O., Schnyder, I., & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, *98*(2), 438–456. http://doi.org/10.1037/0022-0663.98.2.438

Tudge, J. R. H., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory & Review*, *1*, 198–210. http://doi.org/10.1111/j.1756-2589.2009.00026.x

Valiente, C., Swanson, J., & Lemery-Chalfant, K. (2012). Kindergartners' temperament, classroom engagement, and student-teacher relationship: moderation by effortful control. *Social Development*, *21*(3), 558–576. http://doi.org/10.1111/j.1467-9507.2011.00640.x

Van de Pol, J., & Elbers, E. (2013). Scaffolding student learning: A micro-analysis of teacher–student interaction. *Learning, Culture and Social Interaction*. http://doi.org/10.1016/j.lcsi.2012.12.001

Van Geert, P., & Steenbeek, H. (2005). The dynamics of scaffolding. *New Ideas in Psychology*, *23*(3), 115–128. http://doi.org/10.1016/j.newideapsych.2006.05.003

Verenikina, I. (2003). Understanding scaffolding and the ZPD in educational research. In *Proceedings of the International Education Research Conference*.

Vitiello, V. E., Moas, O., Henderson, H. A., Greenfield, D. B., & Munis, P. M. (2012). Goodness of fit between children and classrooms: Effects of child temperament and preschool classroom quality on achievement trajectories. *Early Education and Development*, *23*(3), 302–322. http://doi.org/10.1080/10409289.2011.526415

Voorhis, F. L. Van. (2004). Reflecting on the homework ritual : Assignments and designs. *Theory Into Practice*, *43*(3), 205–212.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, Mass.: Harvard University Press.

Watson, J. E., Kirby, R. S., Kelleher, K. J., & Bradley, R. H. (1996). Effects of poverty on home environment: an analysis of three-year outcome data for low birth weight premature infants. *Journal of Pediatric Psychology*, *21*(3), 419–31.

Webster-Stratton, C., & Eyberg, S. M. (1982). Child temperament: relationship with child behavior problems and parent-child interactions. *Journal of Clinical Child Psychology*, *11*(2), 123–129.

Wechsler, D. (1974). *WISC-R: Manual for the Wechsler Intelligence Scale for Children - Revised*. New York, NY: The Psychological Corporation.

Wertsch, J. V. (1979). From social interaction to higher Psychological processes: A clarification and application of Vygotsky's theory. *Human Development, 22*, 1–22.

Wertsch, J. V. (1984). The zone of proximal development: Some conceptual issues. In B. Rogoff & J. V Wertsch (Eds.), *Children's Learning in the "Zone of Proximal Development"* (pp. 7–18). USA: Jossey-Bass Inc.

Wilding, J., & Barton, M. (2009). *Evaluation of the Strengthening Families, Strengthening Communities Programme 2005/6 and 2006/7*. London: Race Equality Foundation.

Williams, H., van Daal, V., Williams, K. & Swift, J. (2015, September). *Breaking out of the time warp: increasing children's self-efficacy in mathematics through parental involvement in homework.* Paper presented at the annual conference of the British Educational Research Association, Belfast, UK.

Wineburg, S. S. (1987). The self-fulfillment of the self-fulfilling prophecy. *Educational Researcher, 16*(9), 28–37.

Wingard, L., & Forsberg, L. (2009). Parent involvement in children's homework in American and Swedish dual-earner families. *Journal of Pragmatics*, *41*(8), 1576–1595. http://doi.org/10.1016/j.pragma.2007.09.010

Wood, D. (1999). Social interaction as tutoring. In P. Lloyd & C. Fernyhough (Eds.), *Lev Vygotsky: Critical Assessments, Volume 4* (pp. 282–303). London, England: Routledge.

Wood, D., Bruner, J., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, *17*, 89–100.

Wood, D., Wood, H., Ainsworth, S., & O'Malley, C. (1995). On becoming a tutor : Toward an ontogenetic model. *Cognition and Instruction*, *13*(4), 565–581.

Wood, D., Wood, H., & Middleton, D. (1978). An experimental evaluation of four face-to-face teaching strategies. *International Journal of Behavioral Development*, *1*(2), 131–147. http://doi.org/10.1177/016502547800100203

Wood, H., & Wood, D. (1999). Help seeking, learning and contingent tutoring. *Computers & Education*, *33*(2-3), 153–169. http://doi.org/10.1016/S0360-1315(99)00030-5

Xu, J. (2007). Middle school homework management: More than just gender and family involvement. *Educational Psychology*, *27*(2), 173–189. http://doi.org/10.1080/01443410601066669

Xu, J., & Corno, L. (2003). Family help and homework management reported by middle school students. *The Elementary School Journal*, *103*(5), 503–517.

Yang, P.-J., & Lamb, M. E. (2014). Factors influencing classroom behavioral engagement during the first year at school. *Applied Developmental Science*, *18*(4), 189–200. http://doi.org/10.1080/10888691.2014.924710

Zimmerman, B. J., & Kitsantas, A. (1997). Developmental phases in self-regulation: Shifting from process goals to outcome goals. *Journal of Educational Psychology*, *89*(1), 29–36.

Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemporary Educational Psychology*, *39*(2), 145–155. http://doi.org/10.1016/j.cedpsych.2014.03.004

Appendices

APPENDIX A:

Recruitment leaflet and poster for the Homework Project – used in Papers 1-3

University of Sussex

ChaT Lab

Could you help us with our project about homework?

Who are we?

I'm Georgia Leith, a researcher at the University of Sussex (supervised by Dr Nicola Yuill and Dr Alison Pike).

I'm running a study called the **Homework Project**, and I am looking for families to take part!

What is the Homework Project about?

Children are usually first given homework in Year 1, and they'll need to learn and study in a whole new way for it.

We're interested in seeing how children develop these new study skills, and what sort of things might affect their learning and their enjoyment of homework.

P.T.O.

Can you help us?

We're looking for mums* of children in **Year 1** to take part in our study.

It can take place in your home on a day and time that suits you best.

It only takes an hour, and it involves some fun activities and treats!

For more info, turn over this leaflet...

(* Sorry dads, we know you do a great job, but we're only looking at mums in this study!)

What's involved?

We'd like to come and visit you at your home, and videotape you and your child doing your child's homework together.

We've also got a fun activity for you to do together with an Etch-A-Sketch drawing toy.

Your child will also get a chance to meet our friendly puppets, Iggy and Ziggy!

As a thank you...

To say thank you for taking part in the study, your child will receive a certificate and some goodies from us at the ChatLab. Also, we can send you a DVD of the two of you doing the activities together.

More information?

If you'd like to find out more about the project, you can ring me or email me, and I'll be pleased to answer your questions.

You can learn more about the ChatLab at Sussex University, and about me and my research, at the website below:

Website: www.sussex.ac.uk/psychology/chatlab/

Phone: 01273 877698

Email: G.Leith@sussex.ac.uk

Thank you!

Calling all Year 1 pupils!!

Could you help with a study about homework?

We're looking for children in Year 1 and their mums* to get involved in our study.

We'd like to visit you and your child in your home – you'd do some fun activities together, and you'd also get to meet our friendly puppets, Iggy and Ziggy!

Plus, children get a certificate and some goodies, and mum gets a DVD of you working on the activities together.

To find out more, please contact me, Georgia, at:

G.Leith@sussex.ac.uk

01273 877698

The Homework Project is run by Sussex University: www/sussex.ac.uk/psychology/chatlab

(* Sorry dads! We know you do a great job too, but we're only looking at mums in this study!)

Homework Study! G.Leith@sussex.ac.uk 01273 877698

APPENDIX B:

Information sheets for home visits – used in Papers 1-3

University of Sussex

HOMEWORK STUDY INFORMATION SHEET

Thank you for showing interest in our study!

This information sheet tells you a bit about why we are doing this research and what is involved for you and your child. Please take time to read the information carefully and keep this sheet. If you would like to hear more about our study, or have any questions, please contact me on 01273 877698 or email G.Leith@sussex.ac.uk.

What is the purpose of the study?

Homework is a part of every child's education. Parents often help children with their homework, especially when they're young, but what isn't clear is *how* they help. Our study will look into how the child and parent work on homework together, and explore whether their characteristics may play a part. We're also interested in whether homework interactions change over time, so will be doing a follow-up too.

What will happen if I take part?

We would give you a questionnaire asking about what you're like and what your child is like, any qualifications you may have, and your thoughts and opinions. We also want to hear from your child about what he/she thinks you both are like. We'd like to interview him/her about how they feel about school (e.g. 'Do you think school is fun?') and their relationship with you (e.g. 'Do you and your mum have fun together?'), and we use puppets to ask the questions, which children in the past have really enjoyed doing. We will also ask you to sit with your child while he/she does two activities, firstly doing the homework he or she been given from school, and then while he/she does a task using an Etch-A-Sketch. After this, we have some pictures we'd like you both to look at together. We'll record the two of you during these activities, with a video camera and a dictaphone. The study shouldn't take more than an hour to complete. You will be contacted in about six months and asked if you'd be willing to take part in the follow-up study, which will be a shorter version of this study.

What are the possible benefits of taking part?

The information we get from this study will help us understand how homework helps children learn, so you'd be contributing to some really useful research. If you'd like, we can let you know the findings from the study. Your child will also get a certificate and we can send you a DVD keepsake of the videos of the two of you doing the activities together, to watch back whenever you want.

What will happen if I don't want to carry on with the study?

Either of you can withdraw from the study at any time without giving a reason; data already collected will be stored anonymously but no new data collected. It is also your right to withdraw your data at any time prior to publication of findings. No identifying information is included in such publications. You just need to contact me and I'll remove your data from the dataset.

Will my taking part in this study be kept confidential?

Yes. All the data which you and your child provide in the questionnaires are strictly confidential; you will be identified only by a number in the study datasets. There will be no information about the participants in any published work based on findings from this study. Identifiable data will be only accessed by authorised persons in the research team and stored in a secure location. We will not pass your family's information on to any other organisations. The videos will be kept secure and separate from the rest of the data. We may retain the anonymised data for our use in future studies subject to further ethical approval.

What happens to the results of the findings of the research study?

The findings will be published in scientific journals, and also made available on our web site (www.sussex.ac.uk/psychology/chatlab) after the completion of the study.

Who has reviewed the study?

This study has been approved by the Sussex University Life Sciences & Psychology Cluster-based Research Ethics Committee (C-REC). If you have any concerns about the way in which the study is conducted, please contact my supervisors, Nicola Yuill (Nicolay@sussex.ac.uk) or Alison Pike (Alisonp@sussex.ac.uk).

Questions about the study?
Please call Georgia Leith on: 01273 877698
Or email: G.Leith@sussex.ac.uk

Thank you very much for your time!
17th September 2013

University of Sussex

The Homework Project, follow-up visit

INFORMATION SHEET

Thank you very much for taking part in the first section of my study. This information sheet tells you a bit about what's involved in the second section. Please take time to read the information carefully. If you have any questions, please contact me (details at bottom).

What is the purpose of the study?

As you may remember, my research concerns homework. Parents often get involved in their children's homework in different ways, but what isn't clear is *how* they help. Our study will look into how the child and parent work on homework together in the first years of school, and explore whether their characteristics may play a part. Some of these were measured at the first visit, and others will be measured at the second visit, which is why taking part in the follow-up will be so useful. We're also interested in whether homework interactions change over time, which is another reason why the second visit will be useful for research.

What will happen if I take part?

The format of this second visit will be very similar to the first, and will take around 90 minutes to complete. It would start with you sitting with your child while he/she does the homework given by the class teacher, as close to how you normally do it as possible (this will be videotaped, just like at the first visit). It would be best if it's the child's real homework, but just in case there's a problem with that, I'll bring along some Curriculum-based homework-like activity sheets as a back-up.

After this, you will be given a questionnaire (shorter than the last one!) for you to complete while I do a couple of activities with your child. The questionnaire asks for your opinions on homework and your experiences of doing homework with your child. I also want to hear your child's opinion on school, so while you do this I will interview him/her using the puppets Iggy and Ziggy, just like I did last time, asking questions such as 'Do you think school is fun?'.

I shall also do a new activity with your child, which involved building train tracks from a picture using wooden track pieces. The child will be videotaped doing this task; it would be preferable for us to be in a different room to you, as we think that the child may try to get help from mum if she's in sight.

What are the possible benefits of taking part?

The information we gain from this study will help us understand how homework helps children learn, so you will be contributing to important research into child development and education. Families will receive a summary of existing evidence on how best to help with homework. Your child will also receive another certificate and prize, and I'll put together all of the video recordings of you and your child together onto a DVD so you have a keepsake of the experience.

What will happen if I don't want to carry on with the study?

You are free to withdraw from the study at any time without giving a reason; data already collected will be stored anonymously and no new data would be collected. It is also your right to withdraw your data at any time prior to publication of findings. No identifying information is included in such publications.

Will our taking part in this study be kept confidential?

Yes. All the data that you and your child provide in the questionnaires are strictly confidential; you will be identified only by a number in the study datasets. There will be no information about individual participants in any published work based on findings from this study. Identifiable data will only be accessed by authorised persons in the research team and stored in a secure location. We will not pass your family's information on to any other organisations. The videos will be kept secure and separate from the rest of the data.

What happens to the results of the findings of the research study?

We aim to publish the findings from this study in scientific journals, and they will also be made available on our web site (www.sussex.ac.uk/psychology/chatlab). I will send a summary of the findings to all the families who took part in the study.

Who has reviewed the study?

This study has been approved by the Sussex University Life Sciences & Psychology Cluster-based Research Ethics Committee (C-REC), crecscitec@sussex.ac.uk. If you have any concerns about the way in which the study is conducted, please contact my supervisors, Nicola Yuill (Nicolay@sussex.ac.uk) and Alison Pike (Alisonp@sussex.ac.uk).

Questions about the study?

If you have any questions at all, please call me (Georgia) on 01273 877698 or email me at G.Leith@sussex.ac.uk

Thank you very much!

4th December 2014

APPENDIX C:

Full list of variables measured in the Homework Project

Time 1 variables	
Demographics	Siblings (how many altogether/older/younger)
	Mother education level
	Child age
	Child verbal age (BPVS)
	Child gender
Mother questionnaire	Child temperament (surgency, neg affect, effortful control)
	Attitudes towards homework
	Hoped education level for child
	Discipline style (consistent / inconsistent)
	Relationship quality
	Emotional anger
	Household chaos
	Empathy (empathic concern, perspective-taking)
	Attributions to success
	Mind in the Eyes
Child interview	School engagement
	Academic competence
Video: Etch-a-sketch	Child reliability on adult 5 times (1x per min)
	Child 'self-esteem' 5 times (1x per min)
	Child task orientation 5 times (1x per min)
	Mother autonomy support 5 times (1x per min)
	Mother direction 5 times (1x per min)
	Mother involvement 5 times (1x per min)
	Child reliability on adult global
	Child 'self-esteem' global
	Child task orientation global
	Mother autonomy support global
	Mother direction global
	Mother involvement global
	Mother positive affect global
	Mother negative affect global
	Child positive affect global
	Child negative affect global
	Interaction quality global
Video: homework	Mother positive affect global
	Mother negative affect global
	Child positive affect global
	Child negative affect global
	Interaction quality global
	Challenge level

Time 2 variables	
Demographics	Siblings (how many altogether/older/younger)
Mother questionnaire	How much (mins/week) homework child gets
	How appropriate the amount of homework received
	How typical visit was of normal homework
	Attitudes towards homework
	Child's typical homework persistence
	Motivation for helping with homework (controlled, autonomous)
Child interview	School engagement
	Academic competence
Teacher questionnaire	Child's self-regulation in the classroom
	Child's academic competence in relation to peers
Video: homework	Mother positive affect two scores (mins 1-5, mins 6-10)
	Mother negative affect two scores (mins 1-5, mins 6-10)
	Child positive affect two scores (mins 1-5, mins 6-10)
	Child negative affect two scores (mins 1-5, mins 6-10)
	Interaction quality two scores (mins 1-5, mins 6-10)
	Challenge level two scores (mins 1-5, mins 6-10)
	Mother emotional support two scores (mins 1-5, mins 6-10)
	Mother quality of instruction two scores (mins 1-5, mins 6-10)
	Mother autonomy respect two scores (mins 1-5, mins 6-10)
	Child reliability on adult two scores (mins 1-5, mins 6-10)
	Child 'self-esteem' two scores (mins 1-5, mins 6-10)
	Child task orientation two scores (mins 1-5, mins 6-10)

APPENDIX D:

Mother's education level (Natriello & McDill, 1986) – used in Papers 1- 3

We'd like to know about your education level. Please circle the number of the highest qualification you achieved.

1 = left school without GCSEs

2 = finished GCSEs

3 = finished FE qualification (BTEC, NVQ etc.)

4 = finished A-Levels

5 = finished undergraduate degree (BSc, BA etc.)

6 = finished postgraduate degree (MSc, MRes etc.)

7 = finished doctoral degree (PhD)

APPENDIX E:

Interview script for child school adjustment (Ablow & Measelle, 1993) – used in Paper 1

Practice Items

A	Iggy:	I like chocolate.
	Ziggy:	I don't like chocolate.
B	Ziggy:	I don't like to play in the park.
	Iggy:	I like to play in the park.
C	Iggy:	I have one brother and one sister.
	Ziggy:	I have one sister.

****

1. Ziggy: Other kids are smarter than me.
   Iggy: I'm smarter than other kids.

2. Iggy: Other kids know more than me.
   Ziggy: I know more than other kids.

3. Ziggy: I hate school.
   Iggy: I don't hate school.

4. Iggy: I don’t do a good job on my schoolwork.
   Ziggy: I do a good job on my schoolwork.

5. Ziggy: I ask my mum or dad to let me stay home from school.
   Iggy: I don’t my mum or dad to let me stay home from school.

6. Ziggy: I’m better at maths than other kids in my class.
   Iggy: Other kids are better at maths than me.

7. Iggy: I’m a smart kid.
   Ziggy: I’m not a smart kid.

8. Ziggy: I read better than other kids in my class.
   Iggy: Other kids read better than me.

9. Iggy: Schoolwork is easy for me.
   Ziggy: Schoolwork is not easy for me.

10. Iggy: I’m not good at maths.
    Ziggy: I’m good at maths.

11. Iggy: Other kids learn faster than me.
    Ziggy: I learn faster than other kids.

12. Iggy: I’m good at reading.
    Ziggy: I’m not good at reading.

13. Iggy: I’m happy when I’m at school.

Ziggy: I'm not happy when I'm at school.

14. Iggy: I think learning maths is boring.
    Ziggy: I don't think learning maths is boring.

15. Ziggy: In the morning, I say to my mum and dad 'I don't wanna go to school'.
    Iggy: In the morning, I don't say that to my mum or dad.

16. Ziggy: I think school is fun.
    Iggy: I don't think school is fun.

17. Iggy: At school, I do things better than other kids.
    Ziggy: At school, other kids do things better than me.

18. Ziggy: It's hard for me to learn new things.
    Iggy: It's not hard for me to learn new things.

19. Iggy: I like being in school.
    Ziggy: I don't like being in school.

20. Iggy: I think learning to read is boring.
    Ziggy: I don't think learning to read is boring.

APPENDIX F:

Child Behavior Questionnaire, Very Short Form (Putnam & Rothbart, 2006) – used in Papers 1 and 2

For each statement below, please circle the number that indicates the most appropriate response for your child. It would help us if you answered all items as best as you can, even if you are not absolutely certain or if the statement sounds silly! Please give your answers on the basis of your child's behaviour over the last six months.

1 Extremely untrue	2 quite untrue	3 slightly untrue	4 neither true nor untrue	5 slightly true	6 quite true	7 extremely true

Seems always in a big hurry to get from one place to another.	1	2	3	4	5	6	7	n/a
Gets quite frustrated when prevented from doing something s/he wants to do.	1	2	3	4	5	6	7	n/a
When drawing or colouring in a book, shows strong concentration.	1	2	3	4	5	6	7	n/a
Likes going down high slides or other adventurous activities.	1	2	3	4	5	6	7	n/a
Is quite upset by a little cut or bruise.	1	2	3	4	5	6	7	n/a
Prepares for trips and outings by planning things s/he will need.	1	2	3	4	5	6	7	n/a
Often rushes into new situations.	1	2	3	4	5	6	7	n/a
Tends to become sad if the family's plans don't work out.	1	2	3	4	5	6	7	n/a
Likes being sung to.	1	2	3	4	5	6	7	n/a
Seems to be at ease with almost any person.	1	2	3	4	5	6	7	n/a

1 Extremely untrue	2 quite untrue	3 slightly untrue	4 neither true nor untrue	5 slightly true	6 quite true	7 extremely true

Is afraid of burglars or the "boogie man".	1	2	3	4	5	6	7	n/a
Notices it when parents are wearing new clothing.	1	2	3	4	5	6	7	n/a
Prefers quiet activities to active games.	1	2	3	4	5	6	7	n/a
When angry about something, s/he tends to stay upset for ten minutes or longer.	1	2	3	4	5	6	7	n/a
When building or putting something together, becomes very involved in what s/he is doing, and works for long periods.	1	2	3	4	5	6	7	n/a
Likes to go high and fast when pushed on a swing.	1	2	3	4	5	6	7	n/a
Seems to feel depressed when unable to accomplish some task.	1	2	3	4	5	6	7	n/a
Is good at following instructions.	1	2	3	4	5	6	7	n/a
Takes a long time in approaching new situations.	1	2	3	4	5	6	7	n/a
Hardly ever complains when ill with a cold.	1	2	3	4	5	6	7	n/a
Likes the sound of words, such as nursery rhymes.	1	2	3	4	5	6	7	n/a
Is sometimes shy even around people s/he has known a long time.	1	2	3	4	5	6	7	n/a
Is very difficult to soothe when s/he has become upset.	1	2	3	4	5	6	7	n/a
Is quickly aware of some new item in the living room.	1	2	3	4	5	6	7	n/a

1 Extremely untrue	2 quite untrue	3 slightly untrue	4 neither true nor untrue	5 slightly true	6 quite true	7 extremely true

Is full of energy, even in the evening.	1	2	3	4	5	6	7	n/a
Is not afraid of the dark.	1	2	3	4	5	6	7	n/a
Sometimes becomes absorbed in a picture book and looks at it for a long time.	1	2	3	4	5	6	7	n/a
Likes rough and rowdy games.	1	2	3	4	5	6	7	n/a
Is not very upset at minor cuts or bruises.	1	2	3	4	5	6	7	n/a
Approaches places s/he has been told are dangerous slowly and cautiously.	1	2	3	4	5	6	7	n/a
Is slow and unhurried in deciding what to do next.	1	2	3	4	5	6	7	n/a
Gets angry when s/he can't find something s/he wants to play with.	1	2	3	4	5	6	7	n/a
Enjoys gentle rhythmic activities such as rocking or swaying.	1	2	3	4	5	6	7	n/a
Sometimes turns away shyly from new acquaintances.	1	2	3	4	5	6	7	n/a
Becomes upset when loved relatives or friends are getting ready to leave following a visit.	1	2	3	4	5	6	7	n/a
Comments when a parent has changed his/her appearance.	1	2	3	4	5	6	7	n/a

APPENDIX G:

Parenting subscale of the Parent and Family Adjustment Scale (PAFAS: Sanders, Morawska, Haslam, Filus, & Fletcher, 2013) – used in Papers 1 and 2

This section asks about your relationship with your child and your parenting style. Please circle the number next to each statement that best describes you and your child *over the past 4 weeks* on a scale of 1 (not true of me at all) to 4 (very true of me).

	How true is this of you?			
	Not at all	A little	Quite a lot	Very much
I make him/her apologise for misbehaving	1	2	3	4
I tell him/her to stop as soon as I notice him/her misbehaving	1	2	3	4
I give in and do a task myself if he/she does not do what I ask	1	2	3	4
I deliberately ignore his/her minor misbehaviour	1	2	3	4
I give him/her a treat, reward, or fun activity for behaving well	1	2	3	4
I follow through with a planned consequence (e.g. take away a toy) when he/she misbehaves	1	2	3	4
I send him/her to time out (e.g. sit alone in a quiet place) when he/she misbehaves	1	2	3	4
I threaten something (e.g. to turn off the television) when he/she misbehaves but I don't follow through	1	2	3	4
I shout or get angry with him/her when he/she misbehaves	1	2	3	4
I praise him/her when he/she behaves well	1	2	3	4
I nag him/her, or have a long talk about why his/her behaviour is not acceptable	1	2	3	4

	How true is this of you?			
	Not at all	A little	Quite a lot	Very much
I try to make him/her feel bad (e.g. guilt or shame) for misbehaving to teach him/her a lesson	1	2	3	4
I give him/her attention such as a hug, wink, smile or kiss when he/she behaves well	1	2	3	4
I smack him/her when he/she misbehaves	1	2	3	4
I argue with him/her about their behaviour or attitude	1	2	3	4
I deal with his/her behaviour the same way all of the time	1	2	3	4
I give him/her what they want when he/she gets angry or upset	1	2	3	4
I play or read books with him/her	1	2	3	4
I get annoyed with him/her	1	2	3	4
I chat or talk with him/her	1	2	3	4
I encourage him/her to be physically active	1	2	3	4
I enjoy giving him/her hugs, kisses, and cuddles	1	2	3	4
I worry about how he/she will turn out in the future	1	2	3	4
I am proud of him/her	1	2	3	4
I enjoy spending time with him/her	1	2	3	4
I teach him/her to do things by him/herself	1	2	3	4
I have meals with him/her	1	2	3	4
I have a good relationship with him/her	1	2	3	4

APPENDIX H:

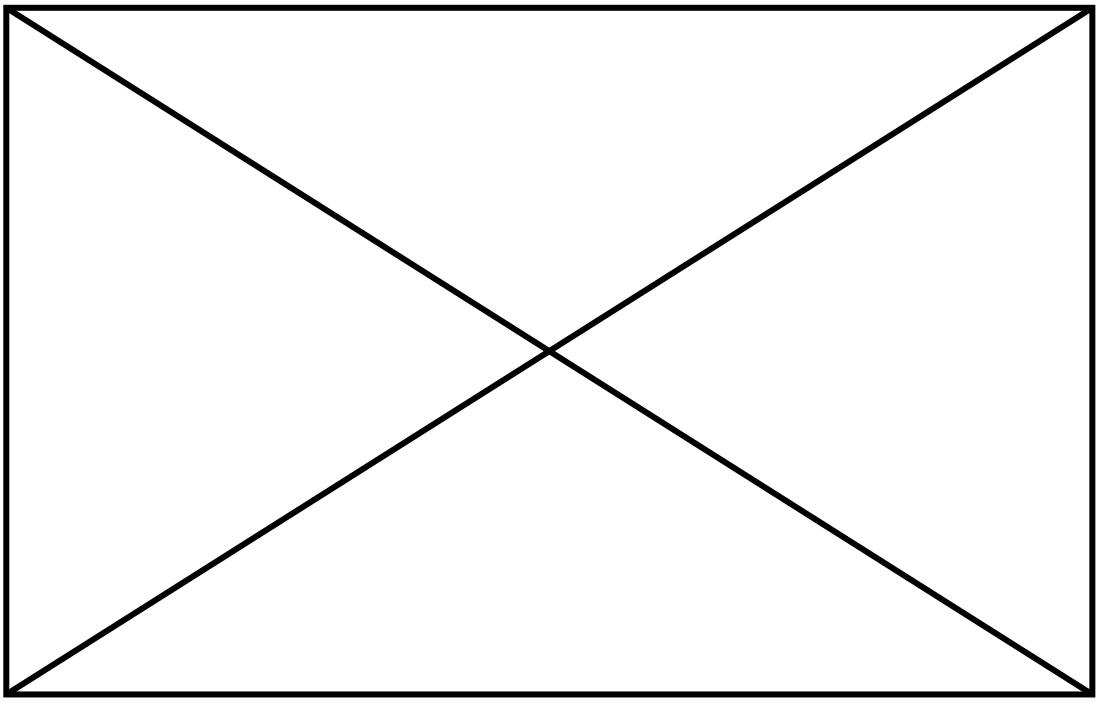
Chaos, Hubbub and Order Scale (CHAOS: Matheny, Wachs, Ludwig, & Phillips, 1995) – used in Paper 1

Below are some things that happen in most homes. Please read each item carefully and circle the number next to each statement that best describes your home.

Definitely untrue 1	Somewhat untrue 2	Not really true or untrue 3	Somewhat true 4		Definitely true 5	
The children have a regular bedtime routine (e.g., same bed each night, a bath before bed, reading a story)	1	2	3	4	5	
You can't hear yourself think in our home	1	2	3	4	5	
It's a real zoo in our home	1	2	3	4	5	
We are usually able to stay on top of things	1	2	3	4	5	
There is usually a television turned on somewhere in our home	1	2	3	4	5	
The atmosphere in our house is calm	1	2	3	4	5	

APPENDIX I:

Shape for Etch-a-sketch drawing task – used in Papers 2 and 3



APPENDIX J:

The *perspective-taking* subscale from the Interpersonal Reactivity Index (Davis, 1983) –used in Paper 2

Please have a look at each of the following statements and rate, for each one, how well you think it describes you.

1 **Does not describe me well**	**2**	**3**	**4**	**5** **Describes me very well**
I sometimes find it difficult to see things from the "other guy's" point of view.	1	2	3	4	5
Sometimes I don't feel very sorry for other people when they are having problems.	1	2	3	4	5
I try to look at everybody's side of a disagreement before I make a decision.	1	2	3	4	5
I sometimes try to understand my friends better by imagining how things look from their perspective.	1	2	3	4	5
If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.	1	2	3	4	5
I believe that there are two sides to every question and try to look at them both.	1	2	3	4	5
When I'm upset at someone, I usually try to "put myself in his shoes" for a while.	1	2	3	4	5
Before criticizing somebody, I try to imagine how *I* would feel if I were in their place.	1	2	3	4	5

APPENDIX K:

***Emotional anger* subscale from the Emotionality, Activity, Sociability and Impulsivity scale (EASI: Buss & Plomin, 1984) – used in Paper 2**

Here are a number of characteristics that may or may not apply to you. Please circle the number next to each statement to indicate the extent to which you *agree* or *disagree* with that statement.

Strongly disagree				Strongly agree
1	2	3	4	5

I am known as hot-blooded and quick-tempered	1	2	3	4	5
There are many things that annoy me	1	2	3	4	5
When displeased, I let people know it right away	1	2	3	4	5
I yell and scream more than most people my age	1	2	3	4	5
I am almost always calm – nothing ever bothers me	1	2	3	4	5

APPENDIX L:

Attitudes towards homework (adapted from Cooper, Lindsay, Nye, & Greathouse, 1998) – used in Paper 2 (only items with asterisks used in Paper 3)

In this section, we'd like you to think about your beliefs about homework, both about homework in general and specifically for your child. For each question, please circle the number which best describes where your beliefs are on the scale.

Don't like it at all				Like it very much
0	1	2	3	4

In general, how do you feel about homework?	0	1	2	3	4
* How do you feel about homework *for your child*?	0	1	2	3	4

Doesn't decrease it				Decreases it a lot
0	1	2	3	4

Do you think homework decreases students' interest in school?	0	1	2	3	4
* Do you think homework decreases *your child in particular*'s interest in school?	0	1	2	3	4

Does not help at all				Helps very much
0	1	2	3	4

Do you think homework helps students learn?	0	1	2	3	4
* Do you think it helps *your child in particular* learn?	0	1	2	3	4
Do you think homework helps students develop study skills?	0	1	2	3	4
* Do you think it helps *your child in particular* develop study skills?	0	1	2	3	4
Do you think homework helps students learn how to manage their time?	0	1	2	3	4
* Do you think it helps *your child in particular* learn how to manage their time?	0	1	2	3	4

APPENDIX M:

Adapted Parent-Child Interaction System (PARCHISY (PARCHISY: Deater-Deckard et al., 1997) – used in Paper 2

Instances of affect

Mother positive affect: instances of *explicit* behaviour displaying happiness, humour, pleasure (*not* reinforcement and encouragement, unless positive behaviour displayed too)

- Laughs, smiles, giggles, shows affection
- Statements referring to child's progress (such as 'excellent!'), *only* if accompanied by notably positive tone and/or expression

Mother negative affect: instances of *explicit* behaviour displaying anger, annoyance, coldness, frustration or disdain (*not* confusion or concentration about the task)

- Rolls eyes, makes negative comment (specifically not when the mother is explaining where the child went wrong), rejecting body language, frowns, criticises
- Statements referring to child's progress (such as 'that's wrong'), *only* if accompanied by notably positive tone and/or expression

Child positive affect: instances of *explicit* behaviour displaying happiness, humour, pleasure; statements referring to enjoyment of task

- Laughs, smiles, giggles, shows affection

Child negative affect: instances of *explicit* behaviour displaying anger, annoyance, coldness, frustration or disdain (*not* confusion or concentration about the task, unless a negative behaviour is displayed with it)

- Rolls eyes, complains, folds arms in anger, shouts, pouts, sulks

Global affect (adapted from PARCHISY in two ways: firstly, not about frequency, only extent; secondly, worded so space for both high positivity and high negativity in one person)

Mother Positive affect: implicit enjoyment of task. Both about quantity and intensity of affect displayed.

(1) Not at all positive

(2) A little / occasionally positive

(3) Somewhat positive

(4) Often positive

(5) Constantly positive

Mother Negative affect: frowning (this does not include the use of frowning when concentrating or in times of confusion about task), cold/harsh voice.

(1) Not at all negative

(2) A little / occasionally negative

(3) Somewhat negative

(4) Often negative

(5) Constantly negative

Child positive affect: implicit enjoyment of task. Both about quantity and intensity of affect displayed.

(1) Not at all positive

(2) A little / occasionally positive

(3) Somewhat positive

(4) Often positive

(5) Constantly positive

Child Negative affect: frowning (this does not include the use of frowning when concentrating or in times of confusion about task), cold/harsh voice

(1) Not at all negative

(2) A little / occasionally negative

(3) Somewhat negative

(4) Often negative

(5) Constantly negative

APPENDIX N:

Maternal attributions to school success (Hyde et al., 2006) – used in Paper 3

We'd like to know about what things you think make the biggest difference for a child to do well at school. Please rank these five factors below in order of how much you believe they might influence a child's school performance.

- Good teacher
- Innate intelligence
- Home environment
- Studying hard
- Luck

Most important ……

……

……

……

Least important ……

APPENDIX O:

Maternal expectations for child's education (adapted from Natriello & McDill, 1986) – used in Paper 3

What level of education do you expect your child will reach? (Please circle highest number)

1 = leave school without GCSEs
2 = finish GCSEs
3 = finish FE qualification (BTEC, NVQ etc.)
4 = finish A-Levels
5 = finish undergraduate degree (BSc, BA etc.)
6 = finish postgraduate degree (MSc, MRes etc.)
7 = finish doctoral degree (PhD)

APPENDIX P:

'Goldilocks' coding scheme for Etch-A-Sketch task – used in Paper 3

Autonomy support: Specifically, promoting and encouraging the child's independence and decision-making in a timely way.

- Scoring 1 or 2: Under-promotion. The child could be encouraged to be more independent (directly or indirectly); not encouraging independence enough at an appropriate point in light of the child's behaviour; the mother is more controlling than necessary; the mother butts in or overrides the child's speech or actions; the mother physically takes the Etch-A-Sketch when the child has not requested her to; this is specifically based on behaviour, thus inferences are not included.
- Scoring 3, 4 or 5: Appropriate promotion. Giving enough encouragement to the child to work appropriately at that given stage, in light of child's behaviour. Can lean towards either under- or over-promotion, whilst still remaining appropriate.
- Scoring 6 or 7: Over-promotion. The mother is requesting more independence of the child than the child can manage or is handing more responsibility to the child than the child has shown it is capable of at that point.

Structure: Specifically, giving directives (verbal or physical, i.e., pointing), instructions, explanations about the task in a timely way. Narrating own actions is included, but own working out of task is excluded.

- Scoring 1 or 2: Under-directing. Not giving the child directives when the child has asked for them, or when the child is showing a need for cognitive support; giving instructions that are too vague and unstructured for the child at that given point.
- Scoring 3, 4 or 5: Appropriate directing. Giving enough directives for the child at that given stage for the child to work appropriately at that given stage; giving a level of instruction and structure that allows the child to continue while challenged (this could be giving no directing at all or a lot of highly-structured directives, depending on the child at that point). Can lean towards either under- or over-directing, whilst still remaining appropriate.

- Scoring 6 or 7: Over-directing. Giving directives to the child despite the child not requesting for help, showing doubt, or losing interest; giving more directives than was requested or necessary; not giving the least possible cognitive support required at that point; giving higher structured, more controlling instructions than was requested or necessary at that point.

Involvement: Specifically, extent to which the mother is attending to the task and the child's actions in a timely way.

- Scoring 1 or 2: Under-involvement. Not attending to the task when the child is needed overseeing or input; talking about other things than the task while the child is requesting or implying help is needed; distracting the child; not taking interest in the task.
- Scoring 3, 4 or 5: Appropriate involvement. Attending to the task and the child an appropriate amount given the child's behaviour at the time. Can lean towards over-involvement or under-involvement, whilst still remaining appropriate.
- Scoring 6 or 7: Over-involvement. Getting more involved (physically, verbally) in the task than is necessary for the child at the time; manipulating the Etch-A-Sketch closer to her while the child is progressing.

Term differentiations

Involvement and autonomy support

- High involvement and high autonomy support: mother is overbearing during task, leaning into Etch-A-Sketch and over-commenting on child's actions (overuse of narrative and praise when child has not shown need)
- High involvement and low autonomy support: mother takes over task when not necessary and does not allow child to take part when child attempts
- Low involvement and high autonomy support: mother is sitting back and not following the child, and when child requests help mother tells them to figure it out

- Low involvement and low autonomy support: mother is effectively not attending to the child's task in any way (mother has left the table) and has no interest in child's actions

Structure and autonomy support

- High structure and high autonomy support: mother keeps reminding child to keep at it whilst also directing child to think about next step
- High structure and low autonomy support: mother gives more detailed instructions than child needs and does not leave child to figure out any part of the task alone, or takes Etch-A-Sketch and narrates own actions to child when child did not request help
- Low structure and high autonomy support: when child shows need for help or request help, mother reminds them to do it alone
- Low structure and low autonomy support: mother takes Etch-A-Sketch and works on task alone, with child watching or not

Structure and involvement

- High structure and high involvement: mother gets physically close to the task, comments throughout and gives instructions when they are not requested
- High structure and low involvement: mother does not attend much to the task, and when she does she gives more, and more detailed, instructions than the child's progress requires
- Low structure and high involvement: mother brings herself more physically close to the task than is necessary and comments on the task in a distracting way but does not give enough directions when child shows its needed
- Low structure and low involvement: mother does not give help when requested and sits away from the child, not attending to the task

APPENDIX Q:

Scaffolding coding scheme during T2 homework (Pianta et al., 1991) – used in Paper 3

Categories:

Supportive presence: providing encouragement, warmth, emotional support

Quality of instruction: explaining the task, time, pacing, and appropriateness of hints

Respect for the child's autonomy: encouraging the child's independence

Scoring:

1 = very inappropriate scaffolding throughout

2 = quite / usually inappropriate scaffolding

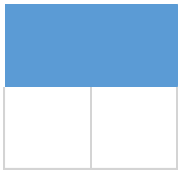
3 = sometimes appropriate, sometimes inappropriate scaffolding

4 = quite / usually appropriate scaffolding

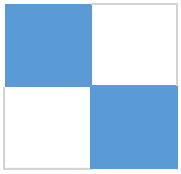
5 = highly / constantly appropriate scaffolding

APPENDIX R:

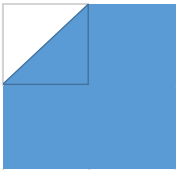
Block design puzzle trials (Wechsler, 1974) – used in Paper 4



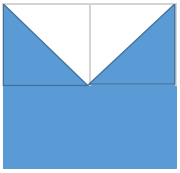
Practice 1



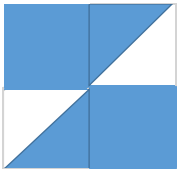
Practice 2



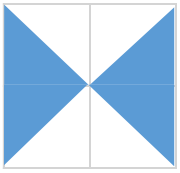
Practice 3



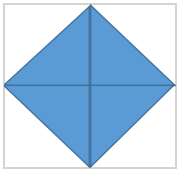
Trial 1



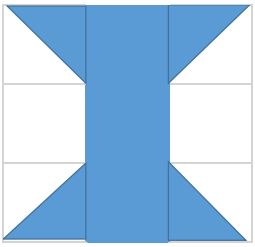
Trial 2



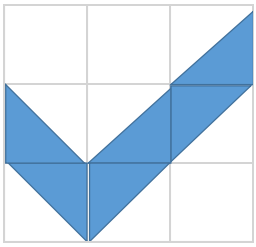
Trial 3



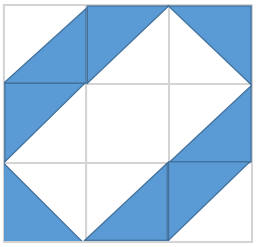
Trial 4



Trial 5



Trial 6



Trial 7

APPENDIX S:

Self- and other-regulation coding scheme (Nader-Grosbois & Lefèvre, 2012) – used in Paper 4

Parent's other-regulatory strategies	
Identification of objective	
1	pays attention to the child or invites him or her to begin
2	approves of the child's understanding of the objective
3	enrols the child's interest in the objective
4	specifies or reminds or repeats the objective
Exploration of means and planning	
1	looks to or listens to the child or questions him or her about problem solving
2	sometimes describes or breaks down or demonstrates problem solving
3	occasionally get physically involved in the task or gives explicit directions
4	regularly executes actions in place of the child or interrupts his or her activity (not correcting)
Joint attention / communication	
1	responds to joint attention and does not initiate
2	occasionally responds to and initiates joint attention
3	sometimes initiates and responds to joint attention
4	very regularly initiates joint attention / initiates throughout interaction
Behaviour regulation / inhibition / involvement	
1	helps or approves exclusively if necessary
2	sometimes responds or initiates behaviour regulation, with help or instructions
3	regularly regulates, helps without child's prior request
4	initiates unnecessary help (overinvolved)
Attention	
1	does not control the child's attention
2	occasionally reactivates/focuses the child's attention (once)
3	sometimes reactivates/focuses the child's attention (twice)
4	very regularly control the child's attention (more than twice)
Motivation	
1	supports the child's self-reinforcement or confirms
2	occasionally gives the child reinforcement
3	sometimes reinforces positively or supports the child's motivation
4	very regularly reinforces positively or supports the child's motivation, praises throughout
Evaluation (towards end of task)	
1	invites or supports the child's self-evaluation
2	expresses suggestions to adjust or correct some of the child's errors
3	gives instructions for the child to correct errors

4	corrects by actions in place of the child
	Child's self-regulatory strategies
Identification of objective	
1	identifies the objective (begins the activity, refers verbally or gesturally to the objective)
2	struggles, and asks for explanation or approval of the objective
3	struggles, and listens to explanation or approval of the objective
4	does not identify, forgets the objective
Exploration of means and planning	
1	planning, anticipation of means displayed
2	actions involve both planning and trial and error
3	actions involve both planning and following instructions
4	execution of actions indicated by the adult, no spontaneous activity
Joint attention	
1	regularly initiates or responds to joint attention (or does not need to)
2	sometimes initiates or responds to joint attention
3	loses interest / has little interest in initiating or responding to joint attention
4	ignores all attempts at joint attention
Behaviour regulation	
1	only expresses requests rarely and when absolutely necessary (controls the task)
2	expresses necessary requests more than rarely
3	expresses some necessary and some unnecessary requests
4	expresses unnecessary requests very regularly, or even excessively (does not control the task)
Attention	
1	manages his/her attention (no lapse of concentration)
2	experiences one lapse of attention
3	manages his/her attention moderately (2 lapses of concentration)
4	does not manage his/her attention (3+ lapses of concentration)
Motivation	
1	regularly expresses pleasure or self-reinforces or maintains his/her motivation
2	moderately or sometimes expresses his/her pleasure or self-reinforces or maintains his/her motivation
3	occasionally expresses pleasure or self-reinforces or maintains his/her motivation
4	does not express his/her pleasure or does not self-reinforce or does not maintain his/her motivation
Evaluation	
1	identifies his/her possible errors and adjusts or corrects them
2	asks/waits for help or approval to correct self-identified errors
3	corrects errors identified by others
4	no personal self-evaluation